(No Model.)

J. W. SMITH.

GOVERNOR VALVE.

No. 560,655. Patented May 26, 1896.

FIG. 1

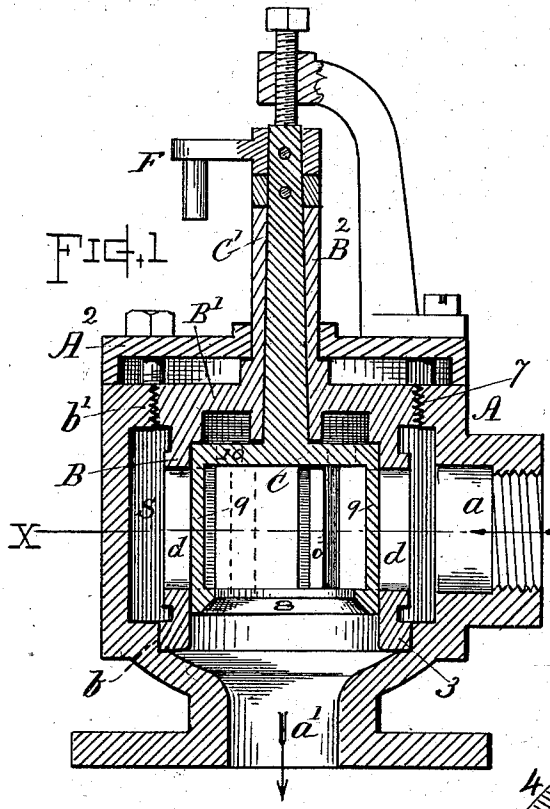


FIG. 3

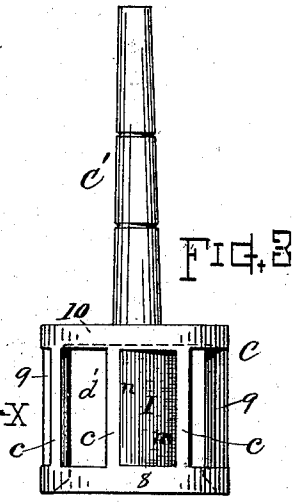


FIG. 5

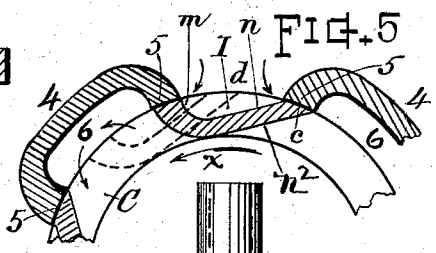


FIG. 2

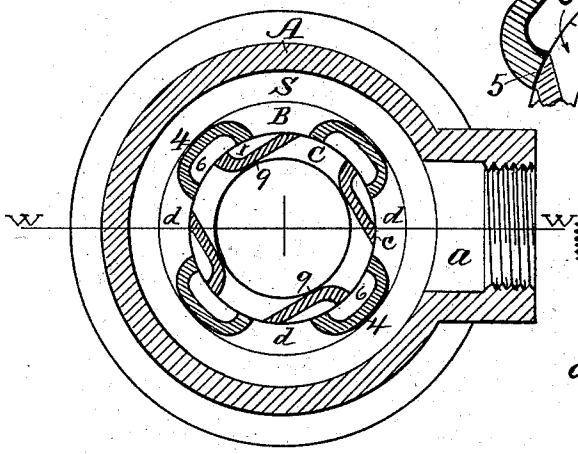
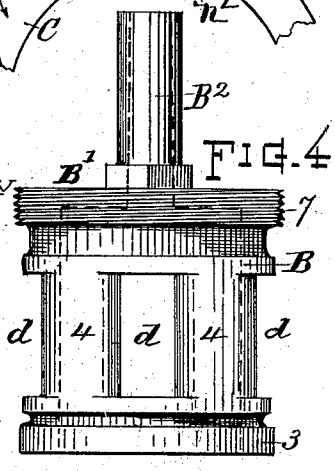


FIG. 4



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UNITED STATES PATENT OFFICE.

JOHN WALTER SMITH, OF WORCESTER, MASSACHUSETTS.

GOVERNOR-VALVE.

SPECIFICATION forming part of Letters Patent No. 560,655, dated May 26, 1896.

Application filed April 1, 1895. Serial No. 543,943. (No model.)

To all whom it may concern:

Be it known that I, JOHN WALTER SMITH, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Improved Governor-Valve, of which the following, together with the accompanying drawings, is a specification sufficiently full, clear, and exact to enable persons skilled in the art to which this invention appertains to make and use the same.

This invention relates to the novel and peculiar structure of the valve and valve-seat, and to the manner of combining said parts together with the chambered body or casing, in that class of governor-valves having cylindric action or that open and close their ports by partial rotation of the valve about a longitudinal axis, different examples of which are illustrated and described in Letters Patent No. 298,049 and No. 324,446, the object of my present invention being to simplify the construction, to obviate whistling or sound and suction on the valve by the passage of steam through the ports; also to render the valve more perfect in its action and balance and easier for control by the revolving governor-balls. I attain these objects by the peculiar improved structure and combination of the parts, as hereinafter explained.

In the drawings, Figure 1 is a central section through the valve, valve-seat, and casing longitudinally of the axis, showing the parts as combined in accordance with my invention. Fig. 2 is a transverse section of the same at line *x x*. Fig. 3 is a separate side view of the valve. Fig. 4 is a separate side view of the valve-seat piece; and Fig. 5 is a transverse section showing, on a somewhat larger scale, one of the valve-bars and its relation to the valve-seat port and bars.

Referring to parts, A denotes the body shell or casting, provided with suitable attaching-bosses having the steam inlet and exit passages *a a'* therein and chambered internally, as at S, its lower end fitted with an annular bearing-surface *b*, and its head fitted with a screw-threaded rim *b'* for the reception of the cylindrical valve-seat piece B. In accordance with my invention this valve-seat piece B has internally a cylindric chamber for containing the valve and is made with an annular end 3, that fits the bearing-surface *b* in the body, a series of longitudinal bars 4 with ports *d* between them, and a solid head or end plate B', connecting said bars, and all formed integral with a hollow sleeve or bearing B^2, that projects outward from the center of said head in line with the axis of the cylindrical valve-seating surfaces, and fitted with a suitable bore through its axis within which the axial stem C' of the valve C is supported and has rotative or partially rotative action. The longitudinal bars 4 of the valve-seat B between the ports *d* are severally formed with narrow seating edges 5, adjacent to the port-openings, while the inner face of the bar between such seating edges is chambered or shaped with a longitudinal concavity 6, as shown. The outer sides of the bar 4 are rounded inward to the ports *d*, making an easy entrance and a comparatively sharp cut-off at the edge of the port. All of the seating edges 5 are dressed off to a common cylindrical contour. The periphery of the head B' is screw-threaded, as at 7, to match the rim *b'*, and the valve-seat piece is screwed into the body, the ring 3 forming a close joint at *b*, while the threaded head closes the opening and makes a steam-tight joint with the top rim of the body.

The valve C is fitted within the cylindrical chamber of the seat B. Said valve is formed with an interior chamber and is composed of an annular end B, longitudinal bars or gates 9, that close the ports *d*, a head 10, and the axial spindle or stem C' integral therewith, that extends through the bearing B^2 and carries at its upper end an arm F to which the governor-rod may be connected in the usual manner. The gates or bars 9 are shaped in cross-section as shown in Figs. 2 and 5, with faced portions *c* along their front and rear edges to match the seating edges 5, and with the portion of the bar between such faces recessed or chambered on the outer side, as at I, the rear edge standing inward from the face with an abrupt curve or offset, as at *m*, and the front edge standing inward with a long curve or flat incline, as at *n*, and a long taper n^2 for the inner surface, thereby giving a rounded heel and a sharp front edge to the respective bars or gates, which operate in relation to the chambered bars 4 of the valve-seat, as illus-

trated in diagram, Fig. 5. The valve opens in the direction indicated by the arrow. The peculiar shape of the seat-bars 4 and valve gates or bars 9 permits the steam to flow in at both the front and rear edges of these gates, when the ports are but slightly opened, (see dotted position, Fig. 5,) and as the opening of the port is increased the passage-way around the rear edge of the gate is gradually closed by the inclined outer surface approaching the seat-angle at the rear of the port. By this peculiar form of the valve and seat in a rotary valve the movement is rendered free and easy, the "sucking" action or tendency of the valve to throw itself closed by the flow of steam therethrough when the port is but slightly open is prevented, a more uniform and lighter resistance is offered by the valve to its operating-governor, and any whistling or sound by the steam passing through the valve is obviated. A chambered cap-plate A^2 is preferably arranged over the end of the seat-piece and bolted to the body. Said cap-plate may carry a bracket for supporting the ball-governor at proper position for its connecting-rod to actuate the crank F and valve-spindle. The governor mechanism can be of that kind illustrated in Letters Patent No. 283,842, or of other suitable construction, for imparting rotative rocking movement to the valve-spindle. Such governor mechanism is not herein shown, as it is not an essential part of my invention.

By constructing the valve-seat piece integral with the spindle-bearing sleeve and fitting the valve and valve-spindle therein, as shown, then supporting the seat-piece in the body or casing by its peripherally screw-threaded head economy and facility in the manufacture are attained and a more practicable and perfect working valve mechanism produced.

I claim and desire to secure by Letters Patent—

1. The cylindrical valve-seat having the solid head with the axially-projecting sleeve or bearing thereon, and the peripheral screw-thread around said head, in combination with the body or chambered shell having the internally-screw-threaded rim, and the rotatable valve arranged within said valve-seat, as set forth.

2. The internally-chambered rotatable valve having its longitudinal gate-bars formed with the faced edges *c* and chambered on their outer sides between said edges, in combination with the cylindric valve-seat provided with longitudinal ports *d* and intermediate bars 4 having on their inner sides the narrow longitudinal seating edges 5 and the concavities or chambers 6 between said seating edges, for the purpose set forth.

3. The valve having its respective gates or bars formed with narrow faces at the front and rear edges thereof, with an intermediate chamber or recess I, the rear portion of the gate-bar standing inward with an abrupt offset or curve *m*, and the front portion with a long curve or incline *n*, substantially as shown, in combination with the valve-seat having the ports *d* and the chambered seat-bars, as set forth.

4. The combination, as described, of the internally-chambered rotary valve having the integral axial spindle and longitudinal gate-bars 9 formed with cylindric face portions *c* and chambers I on their outer sides, as set forth; the cylindric valve-seat piece comprising the bearing-ring 3, longitudinal seat-bars 4 with chambers 6, the ports *d*, the peripherally-threaded head B′ and integral bearing-sleeve B^2, as shown, and the chambered body provided with the annular bearing *b* and screw-threaded top-rim *b′* for supporting said valve-seat.

5. The rotary valve having longitudinal gate-bars, the front edges of said gate-bars being formed sharp and with a long taper on their inner surfaces.

Witness my hand this 23d day March, A. D. 1895.

JOHN WALTER SMITH.

Witnesses:
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