

No. 833,307.

PATENTED OCT. 16, 1906

C. W. DAKE.
GOVERNOR VALVE.

APPLICATION FILED MAR. 22, 1906.

Fig. 1.

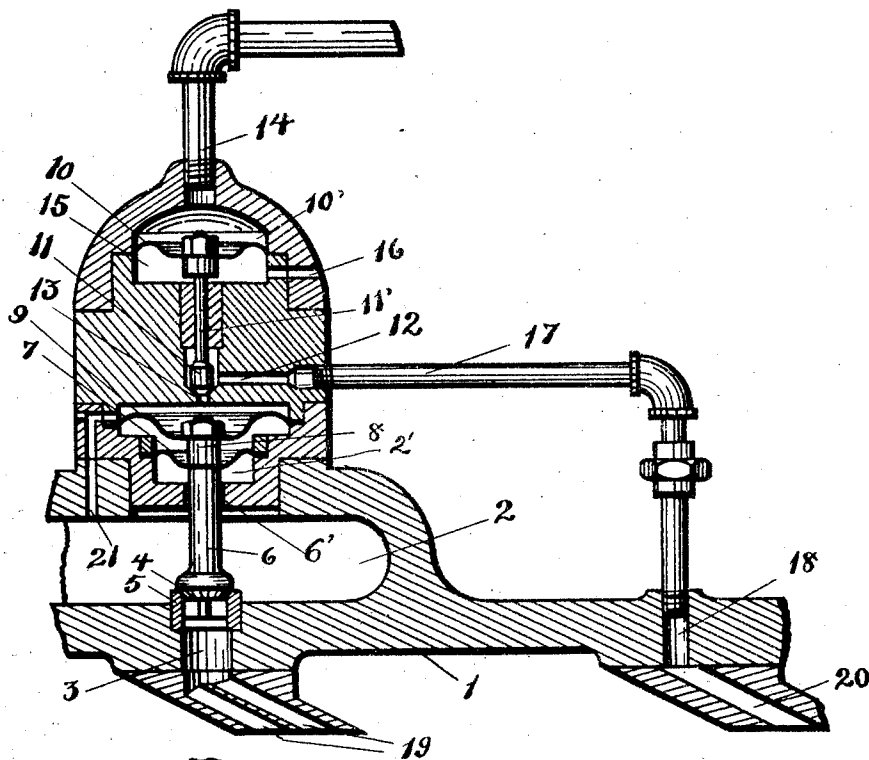


Fig. 2.

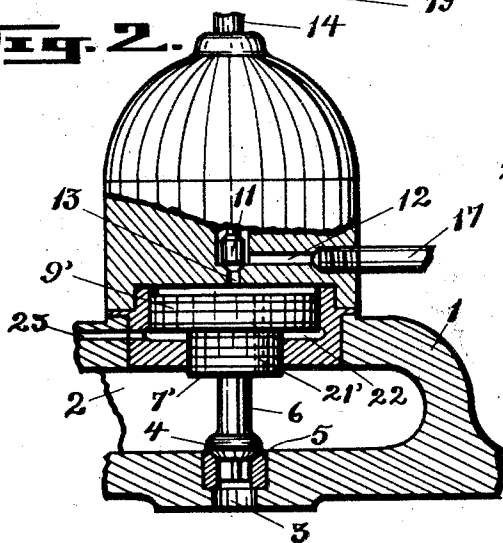
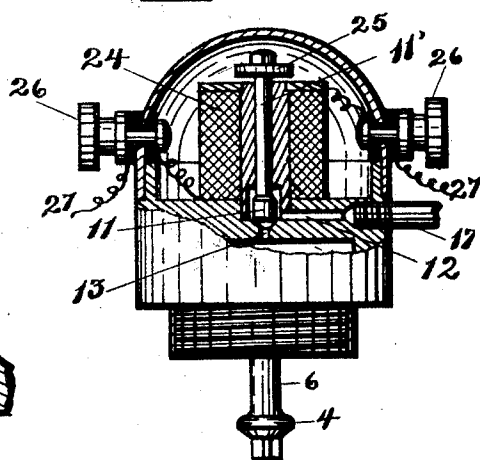


Fig. 3.



WITNESSES:

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GOVERNOR-VALVE.

No. 833,307.

Specification of Letters Patent.

Patented Oct. 16, 1906.

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To all whom it may concern:

Be it known that I, CHARLES W. DAKE, a citizen of the United States, residing at Grand Rapids, in the county of Kent, State of Michigan, have invented certain new and useful Improvements in Governor-Valves, of which the following is a specification.

This invention relates to an improved governor-valve.

The objects of this invention are to provide a valve which can be very readily and easily controlled from the governor and one more especially and particularly adapted for use in turbine-engines and with liquid-governors.

Objects relating to the details of construction will definitely appear from the detailed description to follow.

I accomplish the objects of my invention by the devices and means described in the following specification.

The invention is clearly defined, and pointed out in the claims.

A structure embodying the features of my invention is clearly illustrated in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a vertical detail sectional view of my improved governor-valve in position for controlling and arranged to control the nozzle-valves of an elastic-fluid turbine-engine. Fig. 2 is a modification of the same, where pistons of differential area are made use of in place of diaphragms of differential area. Fig. 3 is a further modification in which the auxiliary valve is controlled by electrical means rather than by the direct pressure of fluid from a fluid-governor.

In the drawings similar numerals of reference refer to similar parts throughout the several views.

Referring to the numbered parts of the drawings, the main casing of an elastic-fluid turbine appears at 1 and embraces a supply-chamber at 2, having a passage 3 to nozzles 14 and 19. A valve 4, seating on a seat 5, is controlled by the stem 6, there being an open space at 6' around the stem 6 of the valve, leading to an auxiliary chamber 2'. A larger diaphragm 9 is secured to the upper or outer end of the valve-stem 6, leaving an intervening space 8 between the diaphragms 7 and 9. A passage 21 extends from the chamber 2 to a point above or outside the upper diaphragm 9. A passage 12 13 is connected by

the pipe 17 to a passage 18, leading to a nozzle-passage 20. A valve 11 controls the passage 13, the valve having a stem 11', which connects to a diaphragm 10, which is between the chambers 10' and 15. The chamber 15 is open to the outside through a passage 16, and the chamber 10' connects by a pipe 14 to a fluid-governor, which is preferably of the type described in my concurrent application. When pressure is exerted in the chamber 10' upon the diaphragm 10, it forces the valve 11 down and closes the passage 13. The action of this device is consequently as follows: When liquid is delivered through the pipe 14, it exerts pressure on the diaphragm 10, which closes the valve 11. When the valve 11 is closed, of course no fluid can pass through the pipe 17 to the passage 18 to the nozzle 20. This of course checks the flow through the passage 21 and causes a heavy pressure to be exerted on the diaphragm 9, which, as the diaphragm 9 is larger than the diaphragm 7, reacts against the same and closes the valve 6, thus completely cutting off the supply of fluid. When the governor acts by withdrawing the fluid through the pipe 14 and relieving the pressure, the valve 11 is of course opened by the pressure of fluid against the same, which immediately relieves the pressure on the diaphragm 9 and permits the elastic fluid to escape therefrom out to the passage 12 through the pipe 17 to the passage 18 to the nozzle 20. The pressure therefore immediately falls on the diaphragm 9, and as the supply thereto is limited through the comparatively small passage 21 the full pressure exerted on the under side of the diaphragm 7 opens the valve 6 and permits a large volume of steam to pass the nozzles 14 and 19, and this continues until the governor again acts and closes the valve 11, when the cycle of operations is repeated. This differential area between the diaphragms 7 and 9 can be secured by the pistons 9' and 7' appearing in Fig. 2; the under side of the upper piston 9' being suitably vented to the outside air by the passage 23, connecting to the area 22 beneath the piston. The lower piston 7' fits closely. The fluid delivers to the upper side of the piston 9', through the restricted passage 21, (indicated by dotted lines,) up through the body of the pistons 7' 9'. In this modification appearing in Fig. 2 the auxiliary valve 11 is illustrated being controlled as in Fig. 1. However, this auxiliary

valve 11 could be controlled by the electro-magnetic means regulated from an electrical governor appearing in my concurrent application. This electrical means is clearly illustrated in Fig. 3. The valve 11 has its stem 11' connected to an armature 25, controlled by the magnetic coil 24, which is controlled by the circuit 27, which connects through the insulated binding-posts 26 26 thereto. Other details of construction could be either like those appearing in Fig. 1 or in Fig. 2.

Having thus described my improved governor-valve and indicated various modifications of details, I desire to state that the details of construction could be still further modified, although I have shown the modifications especially adapted for use with the two varieties of governor which I have illustrated in concurrent applications herewith. I will remark in this connection that the diaphragm construction appearing in Fig. 1 is preferred by me so far as the controlling-valve is concerned, but that where the turbine is used for developing the electrical current of course the electrical device appearing in Fig. 3 will be preferred. Where the turbine is used for other purposes, frequently the structure for controlling the auxiliary valve appearing in Fig. 1 will be preferred.

I desire to claim the governor-valve broadly and shall in this application claim the specific means of controlling the same illustrated in Fig. 1 and shall claim the diaphragm construction specifically, it being my intention not to claim the other specific means in this application, although it is not my intention to abandon the other specific means.

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

1. The combination with the main casing of a turbine, of turbine-nozzles 14, 19 and 20; passages 3 and 18 leading thereto; a main valve 6 with diaphragms 7 and 9 of different areas connecting thereto; an auxiliary valve 11 for controlling the passages to the nozzle 20; a fluid-chamber surrounding the main valve 6, and freely connected to the chamber adjacent to the smaller diaphragm 7; a restricted passage connecting to the chamber adjacent to the larger diaphragm 9; a restricted passage leading from the chamber of the said larger diaphragm through to a suitable nozzle; an auxiliary valve for controlling the said passage to the said second nozzle; a diaphragm connecting to the stem of said auxiliary valve; and connections to the fluid-pressure governor for controlling the diaphragm which controls said auxiliary

valve, all coacting substantially as described and for the purpose specified.

2. In a governor-valve, the combination of a main valve; an auxiliary valve; a restricted passage leading from the main-valve chamber through the auxiliary valve; a pair of diaphragms connected to the main valve, of different areas, with chambers for admitting steam to actuate the same, the chamber of the smaller of which has a direct free connection for holding the valve open, and the larger of which is connected by a restricted passage leading to the auxiliary valve; and governing means connecting to the auxiliary valve, coacting for the purpose specified.

3. In a governor-valve for elastic-fluid turbines, the combination of a main valve connecting to suitable nozzles; an auxiliary valve connecting to a suitable nozzle or nozzles; a restricted passage leading from the main chamber through the auxiliary valve to the said nozzles; suitable means connecting to the main valve, controlled by means of steam-pressure on differential steam areas, the smaller of which areas is acted upon by the free direct pressure from the chamber, and the larger of which is acted upon through the fluid delivered through the restricted passage; and connections to the governor for controlling the auxiliary valve, all coacting substantially as described and for the purpose specified.

4. In a governor-valve, the combination of a main valve; an auxiliary valve; a restricted passage leading from the main-valve chamber through the auxiliary valve; and means connected to the main valve to be actuated by the pressure from the fluid, of different areas, the devices with the smaller area being connected directly and freely to the main-valve chamber, and the means of larger area being connected to the restricted passage leading to the auxiliary valve, for the purpose specified.

5. In a governor-valve, the combination of a main valve controlled by fluid-pressure; an auxiliary passage connected to supply pressure to control said main valve, and to an auxiliary supply to the engine; and an auxiliary valve for controlling the said auxiliary passage, coacting for the purpose specified.

In witness whereof I have hereunto set my hand and seal in the presence of two witnesses.

CHARLES W. DAKE. [L. S.]

Witnesses:

FRED L. CHAPPELL,
CLARA A. SABIN.