

No. 714,994.

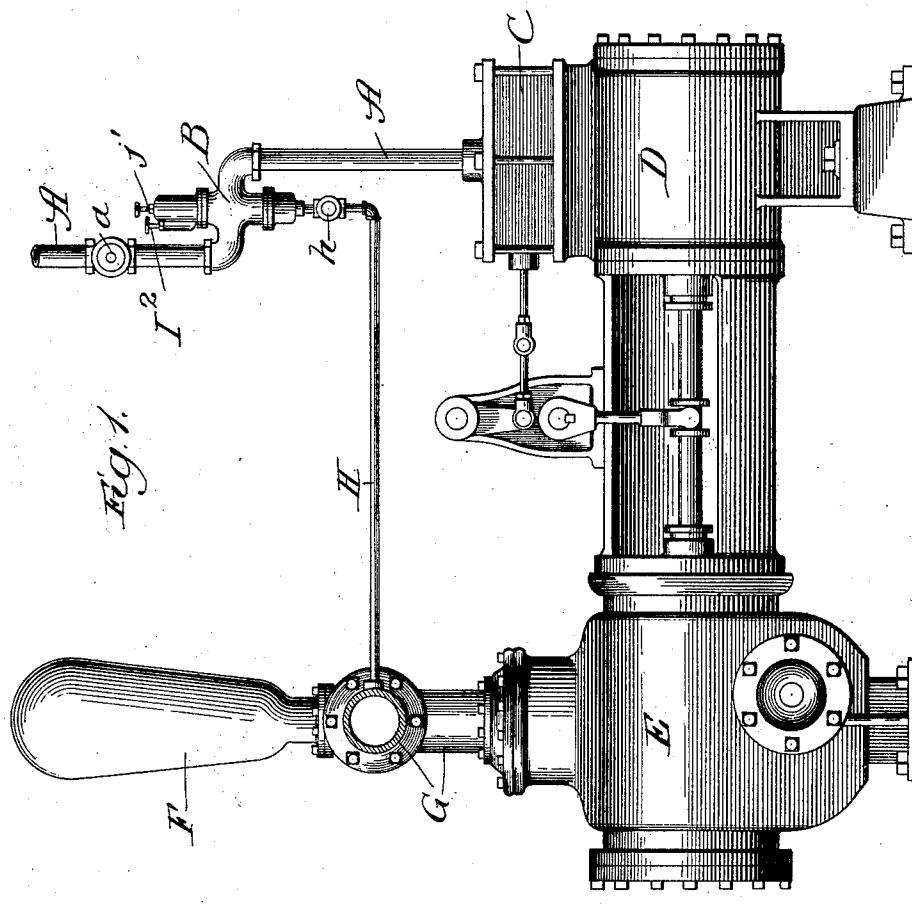
Patented Dec. 2, 1902.

J. A. BALDWIN.
AUTOMATIC PUMP GOVERNOR VALVE.

(Application filed Nov. 29, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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Fig. 3.

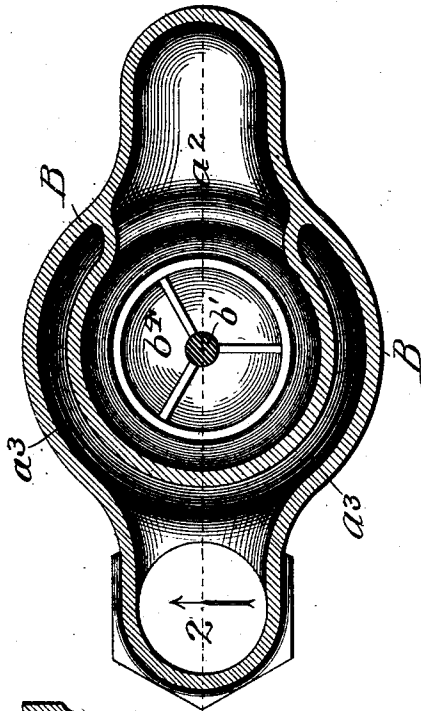
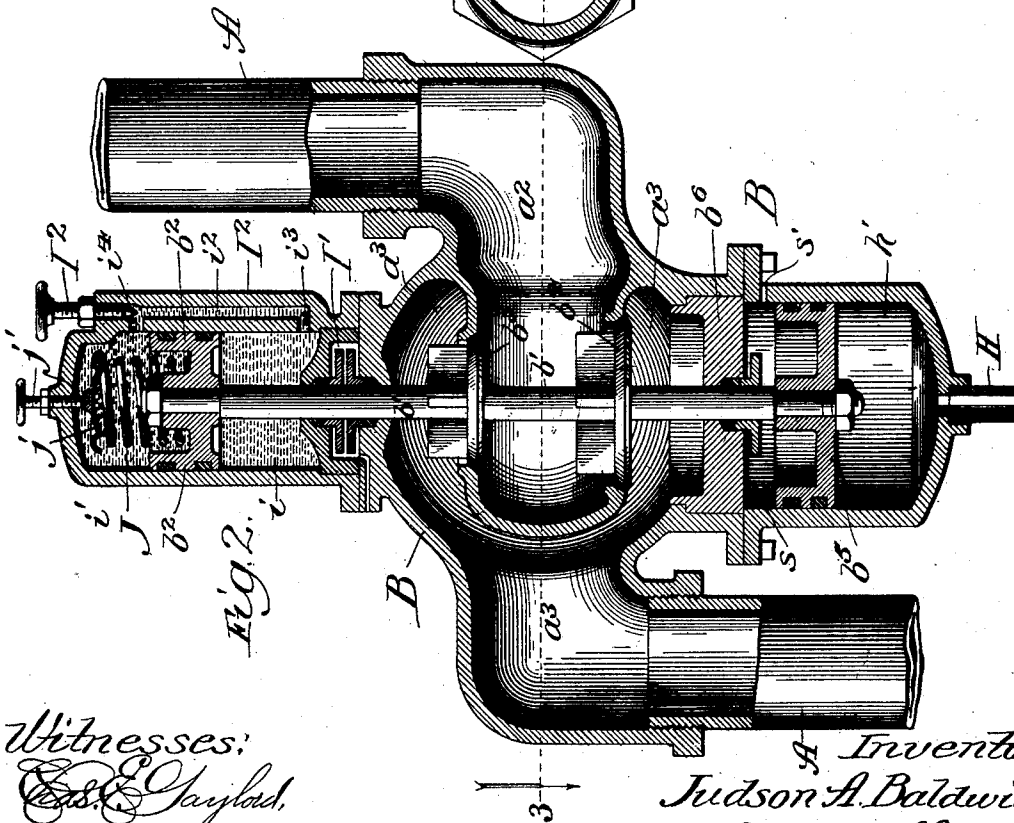


Fig. 2.



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AUTOMATIC PUMP-GOVERNOR VALVE.

SPECIFICATION forming part of Letters Patent No. 714,994, dated December 2, 1902.

Application filed November 29, 1901. Serial No. 84,135. (No model.)

To all whom it may concern:

Be it known that I, JUDSON A. BALDWIN, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Automatic Pump-Governor Valves, of which the following is a specification.

My invention consists of an automatic controlling-valve to regulate the action of a pump and produce a certain action in accordance with the ratio of pressures arbitrarily established between the steam or other fluid used as a source of power and the water or other fluid used as a source of supply in the manner more particularly hereinafter described.

In the drawings accompanying and made a part of this specification like letters represent like parts throughout the various figures.

Figure 1 is a diagrammatic view showing the major parts in their relative positions. Fig. 2 is a perpendicular sectional view of my governor-valve cut on line 2 of Fig. 3, as seen in the direction of the arrow-point. Fig. 3 is a cross-sectional view of my governor-valve cut on line 3 of Fig. 2 viewed in the direction of the arrow-point.

The major parts of my invention and parts essentially connected therewith are represented as follows: A, Figs. 1 and 2, is a steam-supply (or other source of power) pipe leading from a generator to a pump. B, Figs. 1, 2, and 3, is my governor-valve. C, Fig. 1, is a steam-chest on the top of a steam-cylinder D of a pump E, operated by suitable mechanism connected with valves within said steam-chest C. F is an air-chamber on the top of a discharge-pipe G of the pump E. H is a water-pipe connection leading from the discharge-pipe G to the lower part of my governor-valve B. I, Fig. 2, is a chamber for fluids located on the top of my governor-valve B.

The minor parts of my invention are represented as follows: In the interior of my governor-valve B, Fig. 2, are two steam-chambers a^2 and a^3 , one water-chamber h' , and an atmospheric chamber s , having an external opening s' from its upper extremity. Within

my governor-valve B is also located a vertical stem b' , which extends upward, penetrating the chamber for fluids I and entering therein to a considerable extent. To the upper end of this stem b' , within the chamber for fluids I, is fixed a piston-head b^2 , and to the lower end of this stem b' , within my governor-valve B, is fixed a piston-head b^5 , both of which piston-heads are suitably provided with packing-boxes. To the stem b' is also fixed two interior valves b^4 and b^3 of unequal diameters, that of b^4 being greater than that of b^3 . In the interior of my governor-valve B is also a stationary head b^6 , through which the vertical stem b' operates. In the interior of the chamber for fluids I, above my governor-valve B, is located a stationary head I' , through which the vertical stem b' likewise operates. The chamber for liquids I is divided into two compartments i and i' , which are separated by the piston-head b^2 . These compartments i and i' are connected by a duct i^2 , (or other suitable opening,) having orifices i^3 and i^4 at the lower and upper extremities, respectively. On the exterior of the chamber for fluids I is an adjusting-screw I^2 , extending through and into the interior in such a manner as to regulate the flow of fluids through the duct i^2 or its equivalent. In the interior of the chamber for fluids I in the compartment i' is located a coil-spring J, so placed as to bear upon the top of the cylinder-head b^2 . This pressure is further increased and controlled by the cap j , also within the chamber for fluids I, and an external adjusting-screw j' extending through the top of said chamber and operated from without, all for the purpose hereinafter set forth.

In Fig. 1 certain stop-valves are represented at a and h , which are not essential to the working of my device, but are necessarily to be used in case of removal and replacement of the same.

The purpose and operation of my automatic pump-governor valve are as follows: The parts in Fig. 2 of the drawings are represented as being subjected to the maximum of pressure of water or other fluid supply and the minimum pressure of steam or other fluid power, the pressure of water from the operation of the pump E, Fig. 1, through the dis-

charge-pipe G, the water-pipe connection H into the water-chamber h' and beneath the piston-head b^5 , Fig. 2, of my governor-valve B acting to entirely close the interior valves b^4 and b^3 , cut off all communication between the steam-chambers a^2 and a^3 , and in consequence thereof stopping the flow of steam to the pump. If now the ratio of pressures between steam and water be increased, the increased pressure of steam in the steam-supply pipe A and the steam-chamber a^2 of my governor-valve B will overcome the pressure of the water beneath the cylinder-head b^5 , because of the unequal diameters and areas of the valves b^4 and b^3 , aided by the action of the coil-spring J, and will depress the stem b' and its affixed parts, opening communication between chambers a^2 and a^3 and permitting a flow of steam to the steam-chest C and steam-cylinder D, acting upon the pump E to accelerate its motion. Such depression of the interior stem b' and its attendant parts is permitted by the external orifice s' , leading into the atmospheric chamber s behind the piston-head b^5 . Such depression of the interior stem b' and its attendant parts is acted upon by the liquid in the chamber for liquids I to prevent rapidity of movement and violence to the pump, the change of liquid from the compartment i beneath the cylinder-head b^2 to the compartment i' above it having to be through the small duct v^2 (or its equivalent) and its orifices v^3 and v^4 . This action may be further retarded by the adjusting-screw P.

The necessity and purpose of the coil-spring J, Fig. 2, and its attendant parts j and j' is this: It permits of a variance in the amount of pressure in the discharge-pipe G, connecting water-pipe H, and beneath the piston-head b^5 necessary to close the valves b^4 and b^3 against a given pressure of steam in the steam-pipe D and steam-chambers d^2 and d^3 , thereby increasing or diminishing the amount of water that will be supplied by a given pressure of steam. Should the ratio of pressures between steam and water be now decreased, that of water becoming the greater, an exact reverse action will be caused to that above described until my governor-valve again cuts off the supply of steam from the pump.

It will be seen that in the manner above described my device effectually and automatically governs the supply of water, and this by a balance of pressures from the two fluids, steam and water or the like, upon the parts thereof. Further, that the ratio of pressures necessary to produce the balance of power may be increased or diminished as may be required by the varying ratio between demand and supply.

While some of the parts herein described and illustrated are of somewhat similar construction and operation to some of the parts illustrated and described in an application for a patent on an improvement in automatic boiler-feed-controlling valves of even date

herewith, I desire that nothing therein contained shall be deemed to interfere herewith and that nothing herein contained shall be deemed to interfere therewith, but that each may stand as and for the purpose set forth in the same manner and to the same effect that it might have done had the other not contained any such part or specification thereof.

Having thus illustrated and described my device, what I now desire to claim as my invention, and desire secured by Letters Patent, is—

1. An automatic pump-governor valve to be applied to a steam-supply pipe between a steam-pump and a boiler to generate steam therefor, consisting essentially of two steam-chambers communicating directly with the steam-supply pipe; two valve-openings of unequal areas between the two steam-chambers; a water-chamber communicating directly with a water-discharge pipe of the pump; an atmospheric chamber having an external opening from its upper extremity; a fluid-chamber having its extremities connected by a duct; an adjusting-screw, or its equivalent, entering such duct from without; a stem carrying two pistons of unequal areas and two valves of unequal areas, the larger of which pistons is located at one extremity of said stem, and divides the water-chamber from the atmospheric chamber, and the smaller of which pistons is located at the other extremity of the stem within the fluid-chamber, the valves on said stem being placed at points between its extremities and fitted to the valve-openings between the water-chambers; two stationary heads provided with packed orifices through which the stem extends and is free to move; a coil-spring in the fluid-chamber bearing upon the outer surface of the piston therein; a cap placed over said spring and in the extremity of the fluid-chamber; and an adjusting-screw entering from without the extremity of the fluid-chamber and bearing against the cap within, all as and for the purpose set forth.

2. An automatic pump-governor valve to be applied to a steam-supply pipe between a steam-pump and a boiler to generate steam therefor, consisting essentially of two steam-chambers communicating directly with the steam-supply pipe; two valve-openings of unequal areas between the two steam-chambers; a water-chamber communicating directly with the water-discharge pipe of the pump; an atmospheric chamber having an exterior opening from its upper extremity; a fluid-chamber having its extremities connected by a duct; an adjustable screw or its equivalent entering the duct from without; an upright stem carrying two pistons of unequal surfaces and two valves of unequal surfaces, the larger of which pistons is located on the lower extremity of the upright stem and separates the water-chamber from the atmospheric chamber, and the smaller of which pistons is located on the upper extremity of the upright

stem within the fluid-chamber, the valves on said stem being placed at points between its extremities suited to the distance between the valve-openings between the water-chambers, to which openings they are fitted; two stationary heads provided with packed orifices through which the stem passes and is free to move, substantially as and for the purpose set forth.

3. In combination with a valve located in a steam-supply pipe connecting a boiler and pump, automatic controlling mechanism consisting essentially of a fluid-chamber having its extremities connected by a duct; a regulating-screw penetrating said duct from without; a piston in the fluid-chamber; a stationary head separating the fluid-chamber from the steam-space in the valve and provided with a packed orifice; a water-chamber communicating with the water-discharge pipe from the pump; an atmospheric chamber having an exterior orifice at its extremity; a piston separating such water-chamber and atmospheric chamber; a stationary head separating the atmospheric chamber from the steam-space in the valve, and having a packed orifice, which orifice is located diametrically opposite the orifice in the head separating the steam-space in the valve from the fluid-chamber; a stem passing through the valve and through the orifice in the stationary heads, affixed at one extremity to the piston in the fluid-chamber and at the other extremity to the piston separating the water-chamber from the atmospheric chamber; a coil-spring located in the fluid-chamber so as to bear upon the outer surface of the piston therein; a cap placed over the coil-spring and in the extremity of the fluid-chamber; and an adjusting-screw entering from without the extremity of the fluid-chamber and against the cap within, all as and for the purpose specified.

4. In combination with a valve located in a steam-supply pipe connecting a boiler and pump, automatic controlling mechanism consisting of a fluid-chamber having its extremities connected by a duct; a regulating-screw penetrating said duct from without; a piston in the fluid-chamber; a stationary head separating the fluid-chamber from the steam-space in the valve and provided with a packed orifice; a water-chamber communicating with the water-discharge pipe from the pump; an atmospheric chamber having an exterior orifice at its extremity; a piston separating such

water-chamber and atmospheric chamber; a stationary head separating the steam-space in the valve from the atmospheric chamber, provided with a packed orifice, which orifice is located diametrically opposite the orifice in the stationary head separating the steam-space in the valve from the fluid-chamber; a stem passing through the valve, and through the orifices in the stationary heads and affixed at one of its ends to the piston in the fluid-chamber and at the other of its ends to the piston separating the water-chamber from the atmospheric chamber, substantially as and for the purpose set forth.

5. An automatic pump-governor valve located in the steam-power pipe leading from the boiler to the pump, which valve is provided with interior steam-chambers, a water-chamber, connected with the water-supply pipe, an atmospheric chamber having an exterior opening, and an interior movable stem to which is affixed piston-heads and valve-surfaces of unequal areas; and above which valve is fixed a chamber for liquids in which one of said piston-heads moves to displace and replace liquid through a duct or orifice restricted by means of an externally-operated screw; substantially in the manner and for the purpose hereinbefore set forth.

6. In an automatic governor-valve internally provided with unequal movable surfaces, a chamber for fluids; a movable piston-head in the chamber of fluids; a coil-spring between this piston-head and the extremity of this chamber; a duct connecting the extremities of the chamber of fluids provided with a means for increasing and diminishing the aperture thereof; a water-chamber connected to a water-supply pipe; an atmospheric chamber provided with an exterior orifice; a piston-head separating such water-chamber and atmospheric chamber; a stem passing through the governor-valve and affixed to the unequal movable surfaces therein, having one end to pass through the atmospheric chamber and be affixed to the piston separating the same from the water-chamber, and having the other end to pass into the chamber of fluids and be affixed to the piston-head therein, all substantially as and for the purpose set forth.

JUDSON A. BALDWIN.

In presence of—
 ROSWELL SHINN,
 H. S. DERBY.