

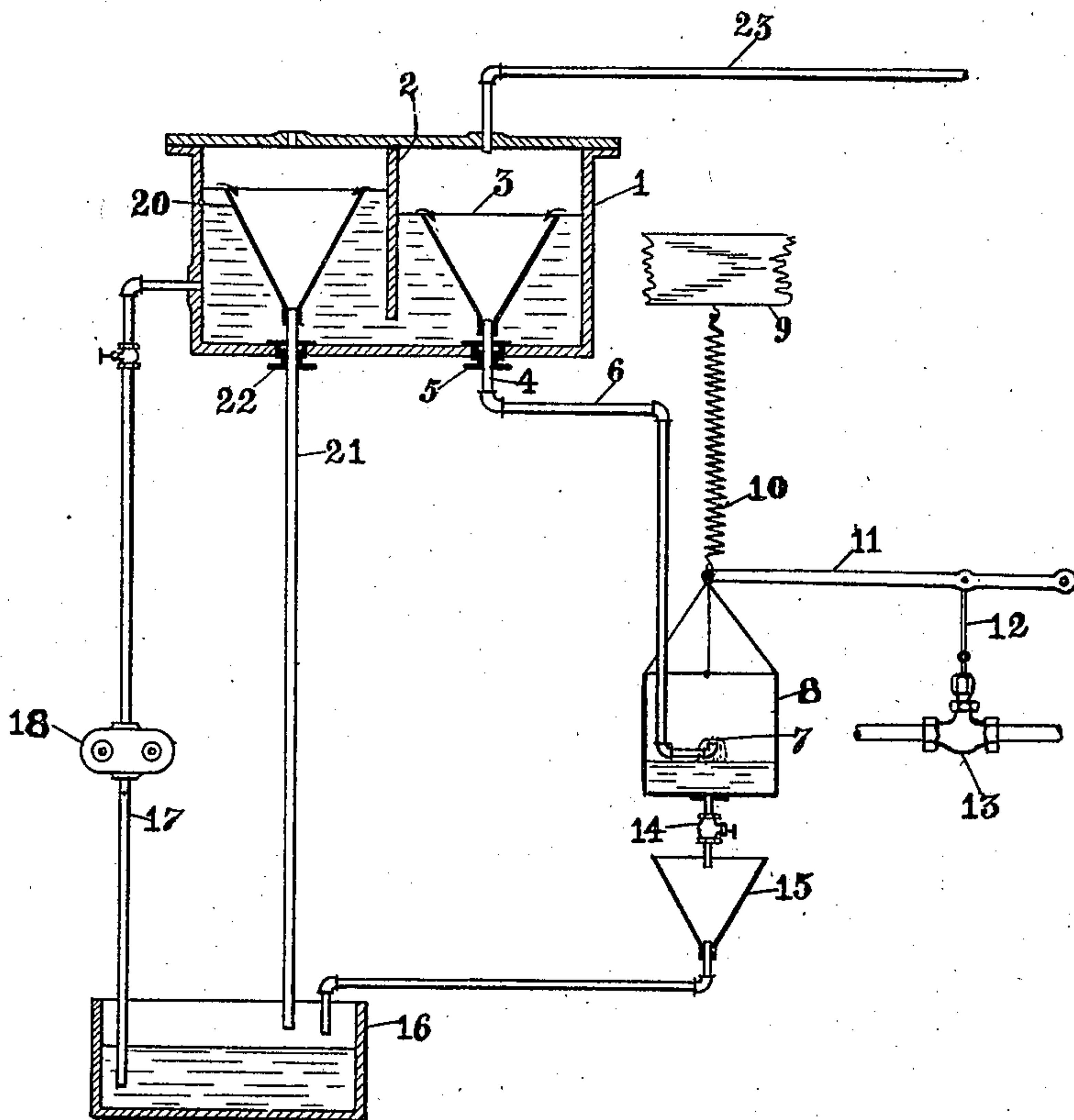
F. L. CROSS.
GOVERNOR FOR VALVES.
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983,876.

Patented Feb. 14, 1911.

2 SHEETS—SHEET 1.

Fig. 1



WITNESSES:

A. M. Shannon.
A. M. Dorr.

INVENTOR

FRANK L. CROSS.

BY

Robert H. [Signature]

ATTORNEYS

UNITED STATES PATENT OFFICE.

FRANK L. CROSS, OF DETROIT, MICHIGAN.

GOVERNOR FOR VALVES.

983,876.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, FRANK L. CROSS, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Governors for Valves, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to a governor for controlling a valve in a fluid distributing system and more particularly for automatically regulating it in accordance with pressure exerted in some portion of the system.

The invention consists in the matters hereinafter set forth, and more particularly pointed out in the appended claims.

In the drawings, Figure 1 is a diagrammatic representation of an apparatus embodying features of the invention; and Fig. 2 is a view showing an arrangement of the apparatus as a differential governor.

In the drawing, a closed reservoir 1 is divided by a depending diaphragm 2 whose lower edge dips into water, oil, or other suitable fluid contained in the tank into a pressure chamber and a relief chamber. A wide mouthed overflow funnel 3 is supported in the pressure chamber of the tank with its stem 4 vertically adjustable in a packing box 5 in the base. A discharge pipe 6 therefrom is arranged with its outlet 7, which is preferably upturned, within a vessel 8 suspended from a fixed support 9 by counterbalancing means such as a spring 10 or a cord passing over a pulley with a weight at the end thereof. The vessel 8 is connected to the outer end of a lever 11 adapted to reciprocate the stem 12 of a valve 13 which it is desired to control. A waste cock 14 discharges from the base of the vessel into any suitable drain 15 and if desired the latter may empty into a catch basin 16 from which the fluid may be returned to the tank 1 through a suitable pipe 17 and a pump indicated at 18. A wide mouthed overflow funnel 20 is secured in the relief compartment of the tank 1 on a tubular stem 21 longitudinally adjustable in a stuffing box 22, the discharge mouth of the stem leading to the catch basin 16 if desired. A pressure pipe 23 extends into the pressure chamber of the tank 1 from any part of a distributing system by whose pressure it is desired to regulate the valve 13.

In operation, the overflow of the relief

compartment is arranged at such a distance above the overflow of the pressure chamber, that the pressure set up therein by the pressure pipe is not quite equal to the back pressure or head resulting from the difference of liquid level in the compartments, so that some liquid is constantly escaping into the vessel 8. The valve 14 is so adjusted that when this head is maintained in the tank 1, sufficient of the liquid that flows over the rim of the funnel 3 into the vessel 8, is retained there, the waste cock 14 not allowing it all to escape, to hold the lever 11 depressed and the valve 13 at the position required. A decrease in pressure in the pipe 23 causes the level in the pressure compartment around the funnel 3 to rise and as the rim of the funnel is of comparatively great circumference, a very slight fluctuation in the level causes a large amount of fluid to enter the funnel 3 and thereby rapidly increase the flow into the vessel 8 and consequently depress the latter. Thus minute changes in the head in the pipe 23 occasion very considerable changes in the volume of water or other fluid entering the vessel 8. By adjusting the levels of the funnels, any desired head may be obtained.

One feature of the invention is the arrangement of the funnels whereby a slight rise in level in the pressure compartment causes a comparatively large amount of liquid to enter the funnel at once, quickly loads the vessel and thereby produce a very rapid change in the position of the valve that is controlled. If the latter is connected to the inlet or outlet of that part of the system from which the pressure pipe leads, the apparatus makes a very effective constant pressure regulator.

By the modified arrangement of Fig. 2, the apparatus becomes a governor controlled by variations in the differences in pressure in two pipes in a system. A closed reservoir 24 is divided as in the first instance by a depending diaphragm 25, with a vertically adjustable overflow funnel 26 in the pressure chamber and second overflow funnel 27 in the relief compartment, with discharge pipes or stems 29 and 28 entering a closed catch basin 30. A return pipe 31 and pump 32 or the like returns the fluid from the basin to the relief compartment. The pipe 29 has a restriction indicated at 33, and is connected by a flexible hose 34 or the like above the restriction with a counterbalanced closed

vessel 35, in communication with the pressure chamber of the reservoir through a flexible hose 36 with a pipe 37 entering the pressure chamber. The pressure chamber is
 5 likewise connected with the catch basin 30 by a pipe 38.

By connecting the relief chamber through a pipe 39 with one branch or part of a distributing system, and the pipe 37 with another branch, the movements of the counter-balanced vessel are controlled by the differences in pressure on the two sides of the reservoir and may be made to operate a valve 40 as indicated.

15 Obviously changes in details of construction may be made without departing from the spirit of the invention, and I do not care to limit myself to any particular form or arrangement of parts.

20 What I claim as my invention:

1. A valve governor comprising a vertically movable vessel having an outlet, a closed reservoir having a pressure chamber in communication with a source of air or
 25 gas under pressure, the level of whose liquid contents is determined by the pressure in the chamber, an overflow from the pressure chamber into the vessel adapted to have a rate of discharge substantially equal to the
 30 flow from the vessel outlet when the chamber contents is at a predetermined level, and means for operating a valve, actuated by the movements of the vessel.

2. A valve governor comprising a vertically movable vessel having an outlet, a closed reservoir having a pressure chamber in communication with a source of air or gas under pressure, the level of whose liquid contents is determined by the pressure in
 35 the chamber, an overflow from the pressure chamber into the vessel adapted to have a rate of discharge substantially equal to the flow from the vessel outlet when the chamber contents is at a predetermined level, a
 40 relief chamber in the reservoir into which the contents of the pressure chamber is backed when the latter chamber is under air or gas pressure, an overflow in the relief chamber above the level of the pressure
 45 chamber overflow, and means for operating a valve, actuated by the movements of the vessel.

3. A valve governor comprising a vertically movable vessel having an outlet, a closed reservoir having a pressure chamber in communication with a source of air or gas under pressure, the level of whose liquid contents is determined by the pressure in the
 55 chamber, an overflow from the pressure chamber into the vessel adapted to have a rate of discharge substantially equal to the flow from the vessel outlet when the chamber contents is at a predetermined level, a
 60 relief chamber in the reservoir into which the contents of the pressure chamber is

backed when the latter chamber is under air or gas pressure, an overflow in the relief chamber above the level of the pressure chamber overflow, both overflows being vertically adjustable, and means for operating
 70 a valve, actuated by the movements of the vessel.

4. A valve governor comprising a vertically movable vessel having an outlet, a closed reservoir having a pressure chamber in communication with a source of air or gas under pressure, the level of whose liquid contents is determined by the pressure in the chamber, an overflow having a wide inlet mouth with horizontal rim within the
 80 pressure chamber and an outlet adapted to discharge into the vessel at a rate substantially equal to the rate of flow from the vessel outlet, when the pressure chamber contents is at a predetermined level, and means
 85 for operating a valve, actuated by the movements of the vessel.

5. A valve governor comprising a vertically movable vessel having an outlet, a closed reservoir divided by a cross-wall into a pressure chamber, and a relief chamber in communication through an opening near the reservoir bottom, a pipe leading from a source of air or gas under pressure into the pressure chamber, a vertically adjustable
 90 overflow in the pressure chamber discharging into the vessel, a vertically adjustable overflow in the relief chamber, and a valve controlling member operated by the movements of the vessel.
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6. A valve governor comprising a vertically movable vessel having an outlet, a closed reservoir divided by a cross-wall into a pressure chamber and a relief chamber in communication through an opening near the reservoir bottom, a pipe leading from a source of air or gas under pressure into the pressure chamber, an overflow pipe vertically adjustable through the pressure chamber base, a funnel forming the overflow pipe inlet, an overflow pipe vertically adjustable through the relief chamber base, a funnel forming the inlet of the latter pipe, and means operated by the vessel movements for controlling a valve.
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7. A valve governor comprising a vertically movable vessel, means adapted to counterbalance the vessel when the latter contains a predetermined quantity of liquid, an outlet from the base of the vessel, a closed
 12 reservoir having a pressure chamber and a relief chamber in communication through an opening near the bottom of the reservoir, an overflow pipe vertically adjustable through the base of the pressure chamber
 12 adapted to discharge into the vessel, a funnel forming the inlet of the overflow pipe, an overflow pipe vertically adjustable through the base of the relief chamber, a catch basin into which the relief pipe and
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the vessel outlet are drained, means for returning the basin contents to the reservoir, and a valve controlling member operated by the movements of the vessel.

- 5 8. A valve governor comprising a vertically movable, counterbalanced vessel having an outlet, a reservoir divided into a pressure chamber in communication with a source of air or gas under pressure, and a
10 relief chamber connected to the pressure chamber by an opening near the bottom of the reservoir, an overflow pipe vertically adjustable through the base of the pressure chamber having an inlet whose area at the
15 rim is nearly as large as the area of the chamber, and an outlet extending into the

open top of the vessel, an overflow pipe vertically adjustable through the base of the relief chamber, and a valve operating member connected to the vessel, the pressure chamber overflow and vessel outlet being adapted
20 to maintain a predetermined amount of liquid in the vessel when a predetermined level is maintained in the liquid contents of the pressure chamber. 25

In testimony whereof I affix my signature in presence of two witnesses.

FRANK L. CROSS.

Witnesses:

C. R. STICKNEY,
A. M. SHANNON.