

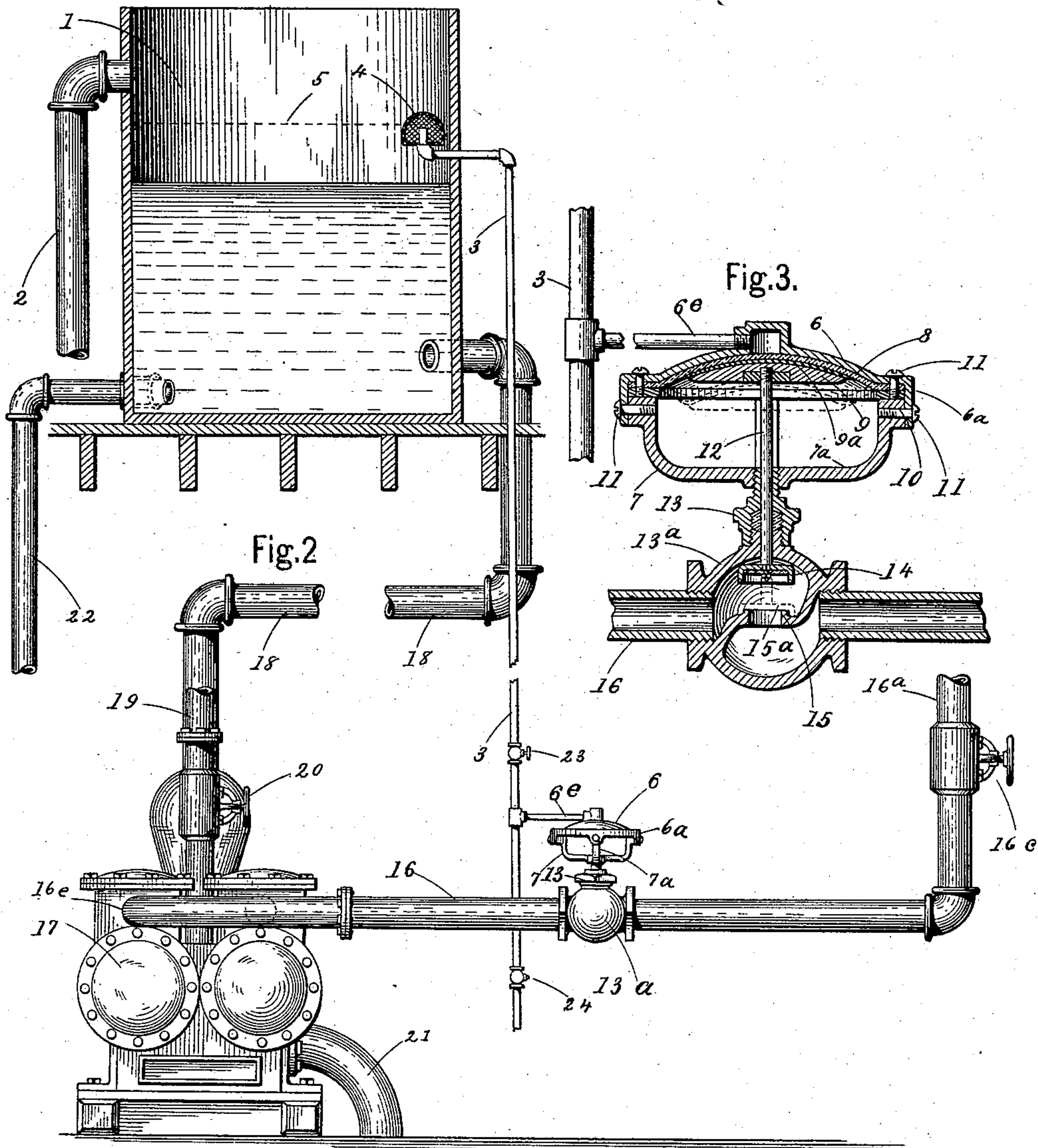
(No Model.)

J. C. STERNS.  
AUTOMATIC PUMP REGULATOR.

No. 570,968.

Patented Nov. 10, 1896.

**Fig.1**



**Witnesses.**

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# UNITED STATES PATENT OFFICE.

JULIUS C. STERNS, OF BUFFALO, NEW YORK.

## AUTOMATIC PUMP-REGULATOR.

SPECIFICATION forming part of Letters Patent No. 570,968, dated November 10, 1896.

Application filed July 15, 1895. Serial No. 555,944. (No model.)

*To all whom it may concern:*

Be it known that I, JULIUS C. STERNS, a citizen of the United States, residing in Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Automatic Pump-Regulators, of which the following is a specification.

My invention relates to an improved pump-regulator for hydraulic elevators, and will be fully and clearly hereinafter described and claimed, reference being had to the accompanying drawings, in which—

Figure 1 represents a vertical central section through the upper water-reservoir that supplies the elevator, showing also a portion of the water-supply pipe, a part of the overflow-pipe, a portion of the pipe for conducting water to the elevator, and a portion of the pipe through which the water flows to the diaphragm. Fig. 2 is a rear elevation of the pump, showing also the underground tank-pipe, a portion of the water-supply pipe, the exhaust-pipe, and steam-supply pipe from the boiler for operating the pump, showing also a side elevation of the diaphragm and its pipe connections. Fig. 3 represents a vertical central section through the diaphragm, its valve, and a portion of the steam-pipe.

The object of my invention is to provide the means for automatically supplying water to a reservoir located in the upper part or top of a building as fast as it is drawn therefrom for operating the elevator.

Referring to the drawings in detail, 1 represents the water-reservoir for supplying water to operate the elevator or for any other purpose for which a regulated supply of water is required. It is preferably located on the top floor or roof of a building and is provided with an overflow-pipe 2 for preventing the water from rising too high or from flowing over the top of the reservoir, and is adapted for conveying the overflow-water either back into the lower supply-tank or to any suitable outlet.

The water-regulating pipe 3 passes from the outside side of the reservoir 1 to the inside and is provided with a cover 4 of fine wire-netting to prevent dirt or other foreign matter from passing into the pipe. It is located at a suitable point below the opening for the overflow-pipe 2 or at or about the level

of the dotted lines 5. This water-regulating supply-pipe is a small pipe and connects with the diaphragm-cover 6 by a branch pipe 6<sup>c</sup>. (See Figs. 2 and 3.)

The diaphragm supporting or holding frame consists of the metallic supporting frame portions 7 and 7<sup>a</sup> and the cover 6, having flange or rim 6<sup>a</sup>.

The diaphragm itself is preferably constructed of rubber 8, (see Fig. 3,) having a disk 9 of wood, with a sheet of flannel 9<sup>a</sup> interposed between the rubber 8 and the wooden disk 9.

The rubber diaphragm 8 is secured in place preferably on a ring or gasket 10 of any suitable material. (See Fig. 3.) The cover being rigidly secured in place by screws 11 seals the diaphragm rigidly in position steam or gas tight.

To the under side of the wooden disk 9 is secured by a screw portion the valve-stem 12. This valve-stem 12 extends down through a stuffing-box 13 into the valve-case 13<sup>a</sup> and is provided with a valve 14, adapted to sit steam-tight, or substantially so, on the valve-seat 15, as shown by the dotted lines 15<sup>a</sup> in said Fig. 3.

The diaphragm-frame is secured by the stuffing-box 13 to the valve-case 13<sup>a</sup>, and to the valve-case is secured a steam-pipe 16, provided with the usual throttle-valve 16<sup>c</sup>. The steam-pipe 16 connects with a steam-boiler of any well-known construction, with the portion 16<sup>a</sup> and with a steam-pump 17 at the end 16<sup>c</sup>.

The steam-pump may be a steam-pump of any well-known construction adapted for pumping water. The pump is provided with a discharge or water-supply pipe 18 for forcing the water up into the reservoir 1 and with the usual exhaust-pipe 19 and valve 20.

21 represents the suction or supply pipe connected with the pump and with an underground reservoir or any suitable source of water supply.

22 is the pipe connected with the elevator in the well-known way for supplying water to operate it.

The pipe 3 is provided with a valve 23 for supplying water to operate the diaphragm. It is also provided with a valve 24 for shutting off or regulating the flow of water from the



pipe 3, the object of which will appear farther on.

The operation of the device is as follows: When the elevator is started, the water required to operate it is drawn from the reservoir through the pipe 22, which operation lowers the level of the water in the reservoir 1, and when it goes down below the top of the pipe 3 or the dotted line 5, for instance, the supply of water flowing down through the pipe 3 ceases. Consequently, the diaphragm being relieved from the pressure of water on its upper side, the steam-pressure acts and opens the valve 14, thereby admitting steam from the boiler to the pump and operating it, whereby water is pumped up through the pipe 18, and when the level of the water in the reservoir 1 is raised above the top of the pipe 3 or dotted line 5 water immediately begins to flow down through said pipe 3, and, the valve 24 being closed to adjust the outlet so that the supply of water at the top of the pipe 3 is greater than the outlet at the lower end of said pipe, a pressure of water is exerted on the diaphragm 8 through the branch pipe 6° (according to said adjustment) sufficient to cause it to overcome the pressure of the steam against the valve 14, and consequently close said valve, thereby shutting off steam from the pump and stopping its operation, which operation, as above described, is repeated every time the elevator is used.

It will be noticed that by adjusting the outlet of water by the valve 24 the pressure of water on the diaphragm may be regulated more or less, or it may be taken entirely off from said diaphragm by turning the valve 24 entirely open, so that the outlet for the water is equal to the inlet.

I claim as my invention—

In a pump-regulator, the combination with a hydraulic elevator of an upper reservoir, a steam-pump for supplying it with water, means for drawing water therefrom, a pipe provided with a cover of wire-netting and having its upper end extend into the water-reservoir and then up to a point near the normal level of the water therein, and having a regulating-valve at or near its lower end, a diaphragm located on the steam-pipe and secured in a holding-case and communicating with said pipe by a horizontal branch pipe connected above the diaphragm at the top of the diaphragm-case, a valve-stem centrally connected to the diaphragm and extending down through a stuffing-box into a valve-chamber, a steam-valve attached to the lower end of the valve-stem adapted to be forced down and close the valve by the pressure of water on top of the diaphragm and valve-stem, and to be opened by the pressure of steam lifting the valve, valve-stem and diaphragm, when the pressure of water on top of the diaphragm is released, whereby, when the water is at its normal level in the upper reservoir, the water flowing down said pipe being restricted at its outlet will exert sufficient pressure on the top side of the diaphragm to close the steam-valve against the pressure of the steam and stop the pump, and when below its normal level it will flow out of said pipe and relieve the diaphragm from pressure, thereby allowing the steam-pressure to force the valve and diaphragm upward, thus opening the valve and operating the pump until the water reaches its level again, substantially as described.

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Witnesses:

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