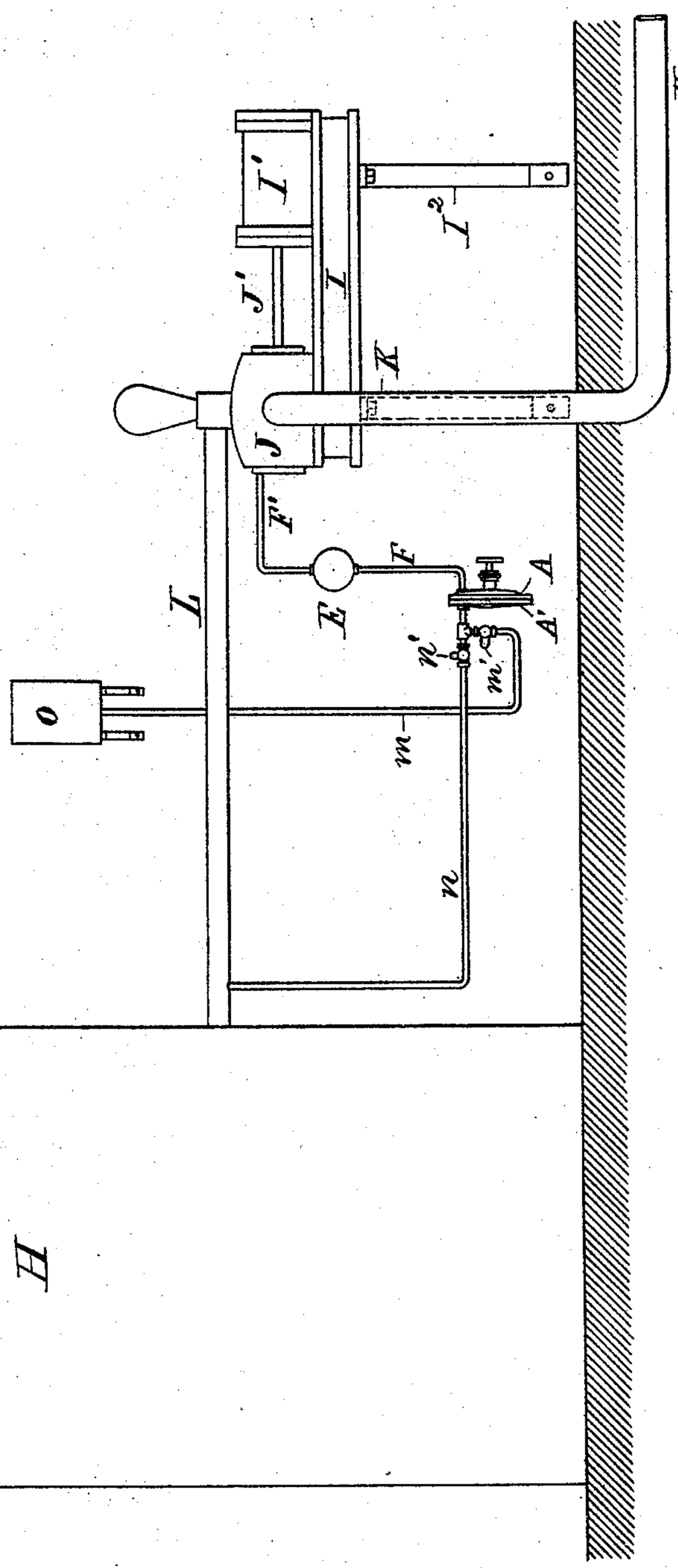
(No Model.) 3 Sheets—Sheet 1.

J. W. HYATT.

COAGULANT FEEDER.

No. 417,034. Patented Dec. 10, 1889.

Fig. 1.



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F. C. Fischer.

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John W. Hyatt: per
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(No Model.)

3 Sheets—Sheet 2.

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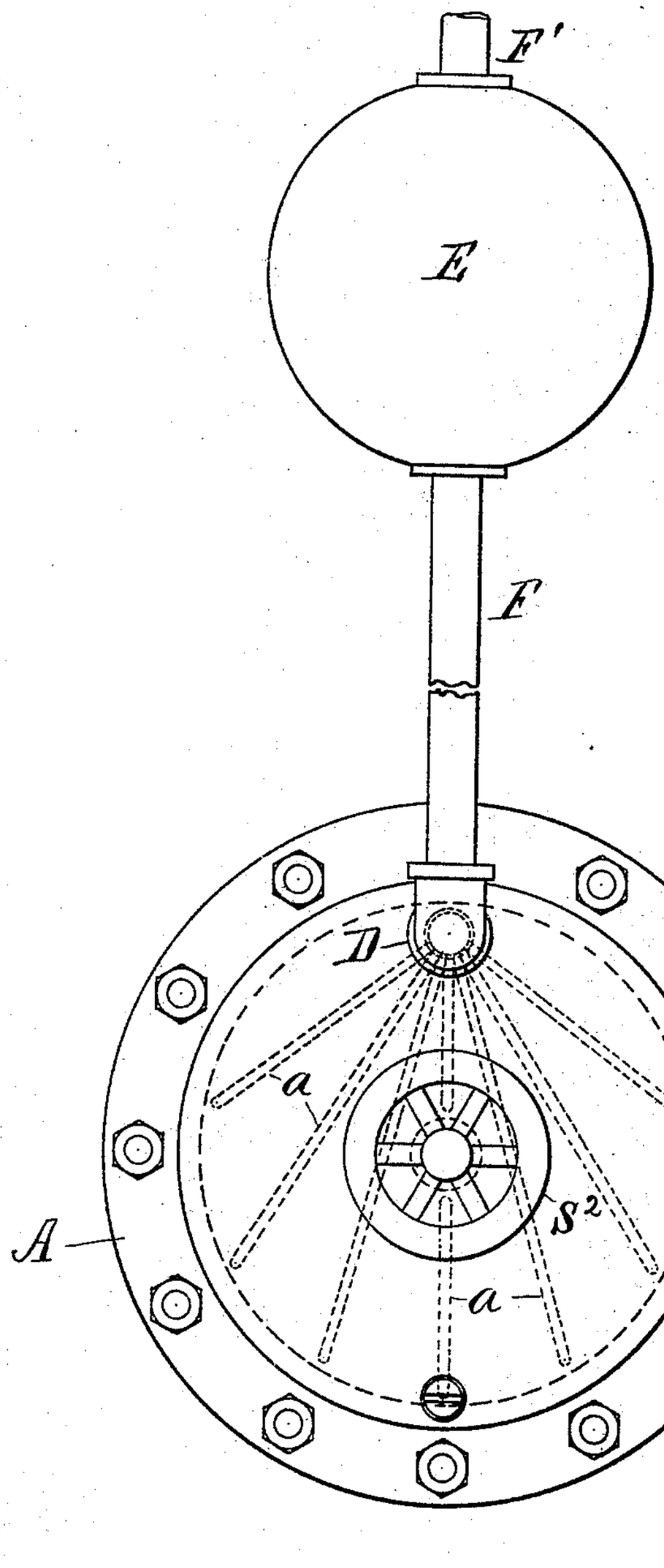

Fig. 2.

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(No Model.) 3 Sheets—Sheet 3.

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Fig. 4.

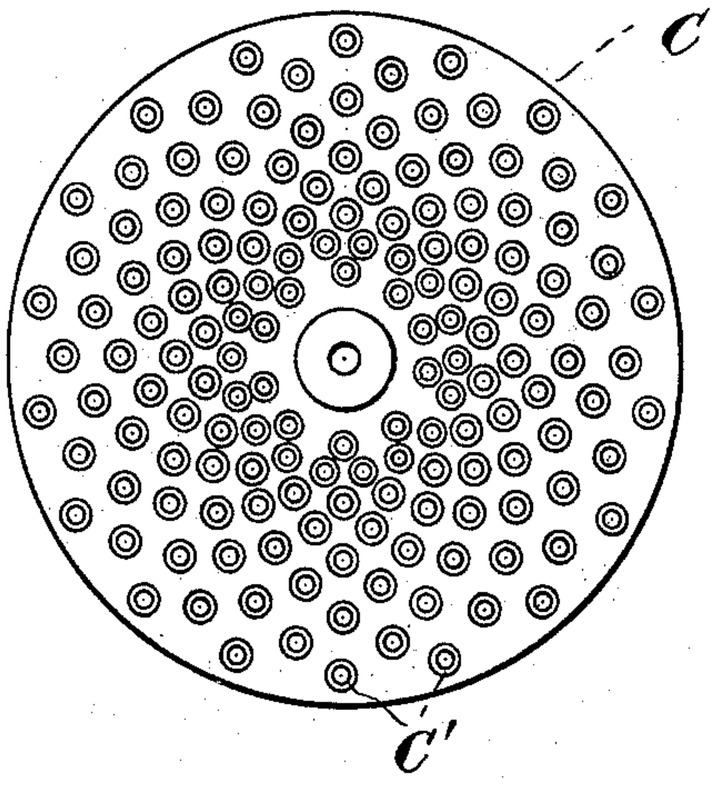


Fig. 5.

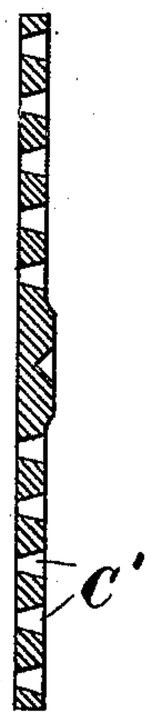
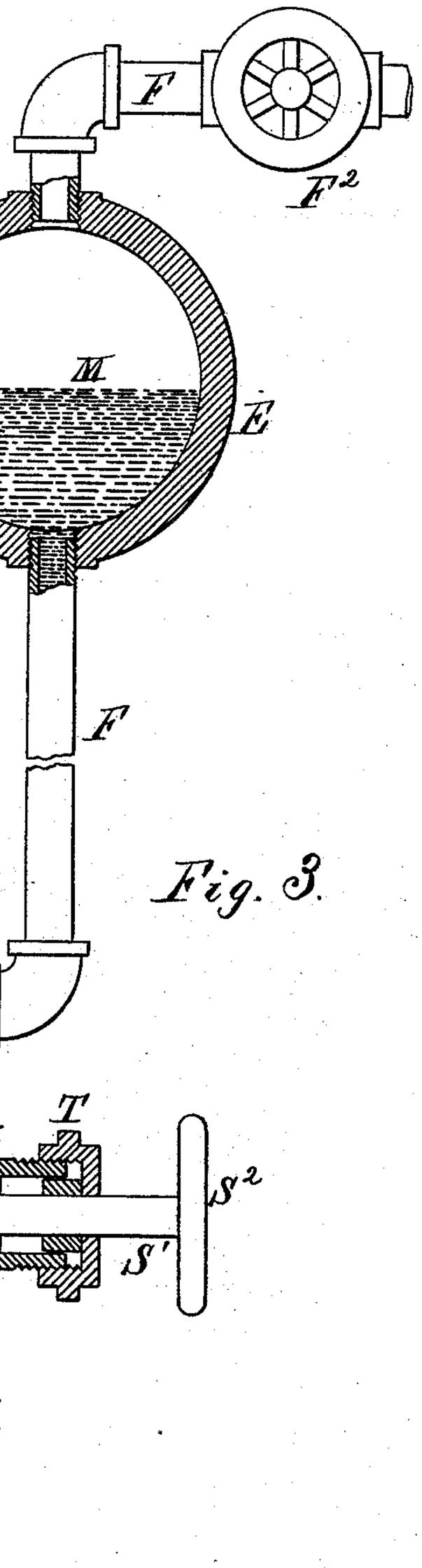


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN W. HYATT, OF NEWARK, NEW JERSEY, ASSIGNOR TO THE HYATT PURE WATER COMPANY, OF NEW JERSEY.

COAGULANT-FEEDER.

SPECIFICATION forming part of Letters Patent No. 417,034, dated December 10, 1889.

Application filed May 9, 1889. Serial No. 310,122. (No model.)

To all whom it may concern:

Be it known that I, JOHN W. HYATT, a citizen of the United States, residing at Newark, Essex county, New Jersey, have invented certain new and useful Improvements in Feeders for Chemical Reagents, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

The object of this invention is to furnish a means of feeding a chemical reagent in liquid form to the water discharged under pressure by a force-pump, and the improvement is particularly applicable to feeding a small quantity of such reagents uniformly to the fluid in its passage to a filter for precipitating the impurities therein before filtration.

In my present construction I employ a flexible diaphragm confined in a suitable casing or chamber, which operates as a pump-chamber to propel the reagent in a definite volume from a suitable reservoir to the fluid under pressure in the discharge-pipe from the pump. One side of the diaphragm-chamber is connected with a reservoir of the reagent and with the discharge-pipe of the pump by suitable pipes and check-valves, and the other side of the chamber is connected with one of the pump-cylinders (as the steam or water cylinder) in which the pressure is intermittingly varied, so that such intermittent pressure may vibrate the diaphragm and thus operate it in the desired manner.

As the pressure available from the fluid-cylinder of the pump to vibrate the diaphragm is no greater than that existing in its discharge-pipe, the diaphragm could not be operated to propel the reagent without some additional force, and this force I secure by inserting a supply of mercury in the chamber upon the side of the diaphragm opposite to that in which the reagent is admitted, the mercury being preferably extended into a vertical pipe connected with the diaphragm-chamber, so as to secure the desired head of pressure.

It is obvious that when the pressure operates from the fluid-cylinder of the pump to move the diaphragm it is supplemented by the pressure of the mercury-column, and is thus enabled to overcome the slight friction of the reagent in the pipes or passages, leading it from the chamber to the fluid under pressure in the delivery-pipe of the pump.

To force the reagent into the diaphragm-chamber in opposition to the mercury-pressure when the suction exists in the fluid-cylinder of the pump, I utilize the pressure of the atmosphere by admitting the air freely to the reservoir of the reagent and make the height of the mercury-column less than thirty inches, so as to be overbalanced by such atmospheric pressure.

The operation of my invention will be readily understood by reference to the annexed drawings, in which—

Figure 1 represents a force-pump connected with a filter and with my device for feeding the reagent. Fig. 2 is an elevation of the diaphragm-chamber with mercury-reservoir attached. Fig. 3 is a vertical section upon the center line of Fig. 2. Fig. 4 is a side view of the perforated disk, and Fig. 5 is a transverse central section through the center of the same.

The arrangement of the several elements is shown in Fig. 1, in which H is a filter; I, the bed of the steam-pump for supplying the same with water; I′, the steam-cylinder of such pump; J, the water-cylinder; J′, the piston-rod between the two cylinders; K, the suction-pipe of the pump, and L the pipe delivering the water to the filter. The pump is shown mounted upon brackets I^2, so that the reagent-feeder (lettered A A′) may be located below the level of the cylinder J. F F′ is the pipe connecting the casing A with such cylinder, and E a mercury-reservoir inserted in such pipe.

m is a pipe provided with check-valve *m′* and connecting the nozzle D′ with the reagent-tank O.

n is a pipe provided with check-valve *n′*, connecting the same nozzle with the filter-pipe L.

The construction of the feeder is shown upon a larger scale in Fig. 3, in which B is the diaphragm; C, a perforated disk fitted within a cylindrical recess by the side of the diaphragm in the casing A. A screw S is

fitted in a screw-nozzle U upon the casing A and provided with shank S′, projected through stuffing-box T, and with wheel S^2 to turn it for setting the disk to and from the diaphragm, and thus regulating the extent of its vibrations. Mercury M is shown in the reservoir E and connected by the pipe F with the nozzle D, and is thus supplied within the casing A and presses upon one side of the diaphragm. The outlet from the casing to the nozzle D′ is provided with a grating G, to prevent the pressure upon the diaphragm from forcing it injuriously from such outlet. The diaphragm is vibrated by the atmospheric pressure operating through the pipe *m* from the tank O alternately with the pressure from the pump-cylinder J and the column of mercury in the pipe F and reservoir E.

The object of the disk C is merely to arrest the movements of the diaphragm to determine the volume of reagent discharged at each vibration, and to permit the mercury to pass freely through the disk to press upon the diaphragm the disk is provided with numerous holes C′.

In Figs. 2 and 3 channels or grooves *a* are shown radiating from the outlet of the casing A′, only one of the grooves being shown in Fig. 3, leading toward the grating G to facilitate the discharge of the reagent from the casing when pressed by the diaphragm.

From the above description it will be seen that my entire construction is very cheap, as the feeder itself consists merely in the casing A A′, with the movable disk and diaphragm secured therein, and provided with the adjusting-screw S, while all the other features of the construction consist of pipes and valves of ordinary construction and of the mercury-reservoir E, which is provided merely with threaded holes for the pipes F F′. The mercury would operate efficiently in the pipe F without any reservoir, provided the movement of the diaphragm did not necessitate too great a variation in the height of the column, and the object of the reservoir is merely to increase the volume and surface area of the mercury, so that its level may be but slightly changed when the mercury flows intermittingly into the feeder.

A valve F^2 is shown in Fig. 3 in the pipe F′, which would be used, if required, to stop the feeder entirely from operating.

By fitting the disk C in a cylindrical recess it is made and supported more cheaply than by attaching it to the adjusting-screw S.

Having thus set forth the nature of my invention, what I claim is—

1. The combination, with a force-pump delivering the fluid to be treated under pressure and having a fluid-cylinder in which the pressure is intermittingly varied, of a discharge-pipe from the said pump, a flexible diaphragm, a casing containing the same, a connection from one side of the casing to the said discharge-pipe and to a reagent-tank by suitable pipes and check-valves, and a pressure-pipe between the other side of the casing and the fluid-cylinder of the pump, and a column of mercury inserted in such pressure-pipe and thereby exposed to the intermittent pressure in the fluid-cylinder, as and for the purpose set forth.

2. The device for feeding a chemical reagent under pressure and adapted for operation when connected with a fluid-cylinder in which the pressure is intermittingly varied, consisting in the diaphragm-casing A A′, provided with pipe-nozzles D D′, the diaphragm B, the disk C, supported loosely in a cylindrical recess, and the means for adjusting the disk to and from the diaphragm, as the screw S, substantially as herein set forth.

3. The device for feeding a chemical reagent under pressure and adapted for operation when connected with a fluid-cylinder in which the pressure is intermittingly varied, consisting in the diaphragm-casing A A′, provided with pipe-nozzles D D′, and with the grating G, the diaphragm B, the perforated disk C, and the screw S, for adjusting the disk to and from the diaphragm, substantially as set forth.

4. The device for feeding a chemical reagent under pressure and adapted for operation when connected with a fluid-cylinder in which the pressure is intermittingly varied, consisting in the diaphragm-casing A A′, provided with pipe-nozzles D D′, and with the grating G, the diaphragm B, the perforated disk C, the screw S, for adjusting the disk to and from the diaphragm, and the mercury-reservoir E, connected with the casing A upon the opposite side of the diaphragm to the grating G, and provided with the pipe F′, for connection with the fluid-cylinder, in which the pressure is intermittingly varied, substantially as herein set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOHN W. HYATT.

Witnesses:
T. H. BUMPUS,
THOS. S. CRANE.