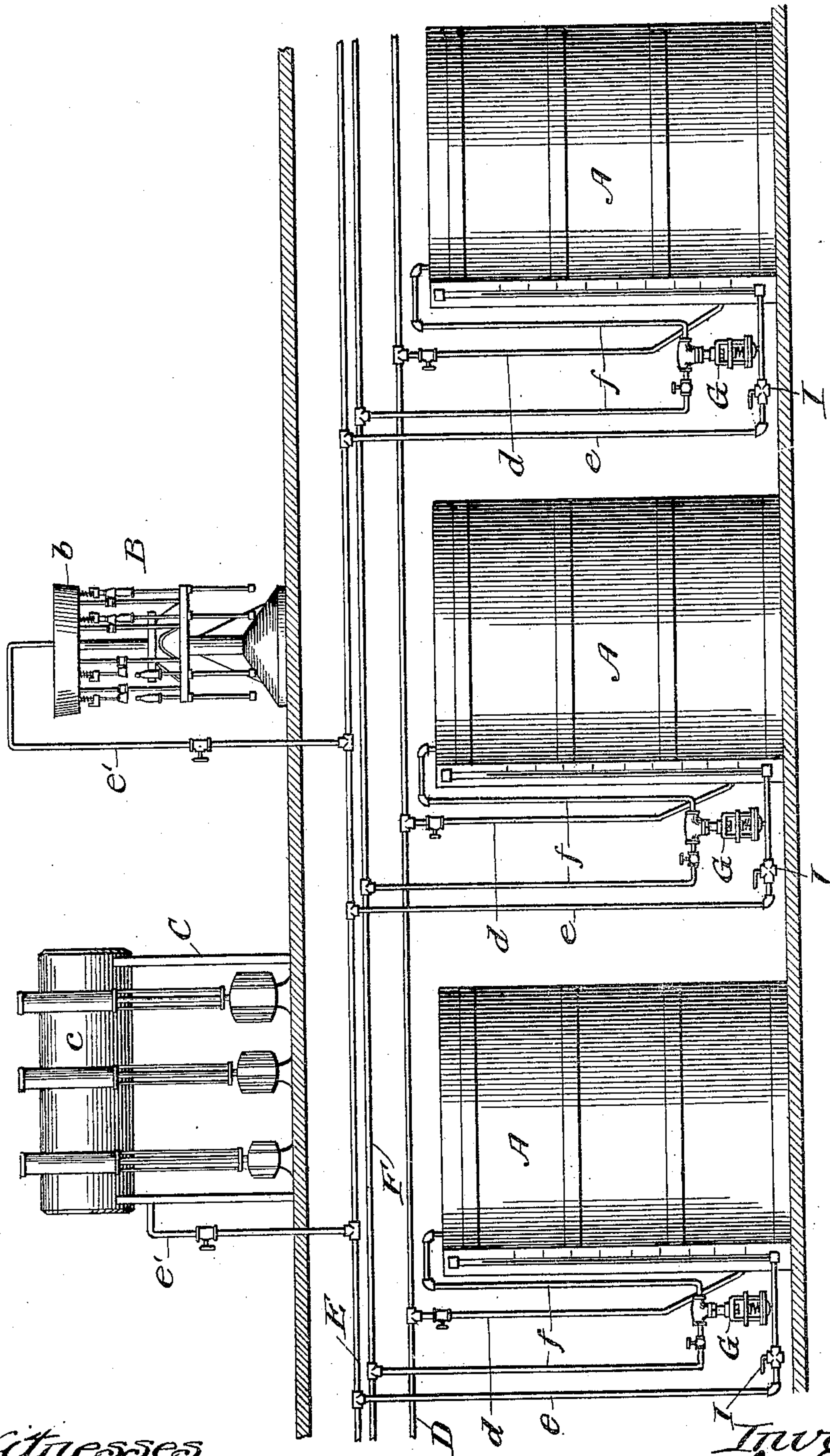


C. L. BASTIAN.
METHOD OF DELIVERING LIQUID.
APPLICATION FILED OCT. 6, 1906.

934,956.

Patented Sept. 21, 1909.
3 SHEETS—SHEET 1.

Fig. 1.



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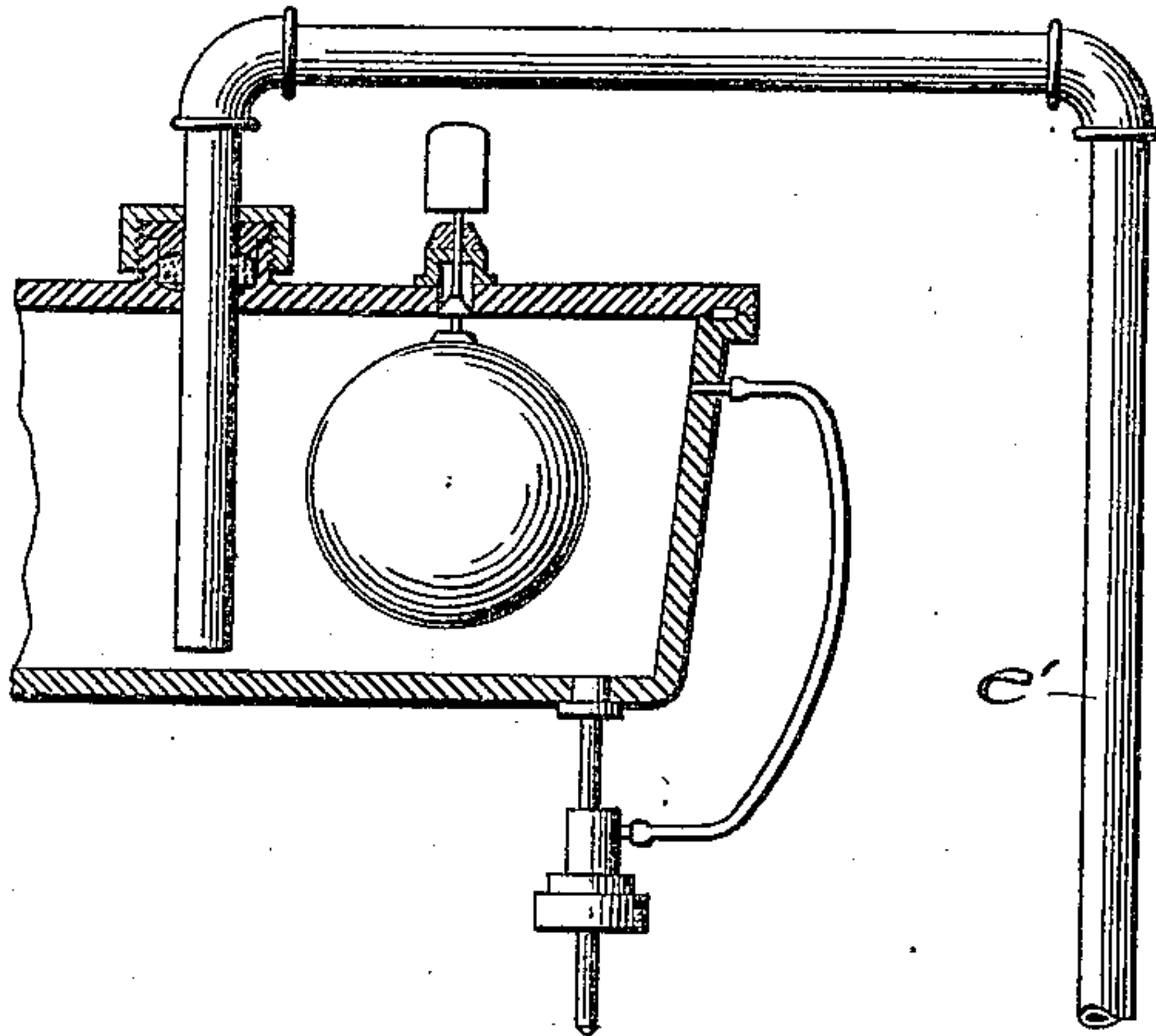
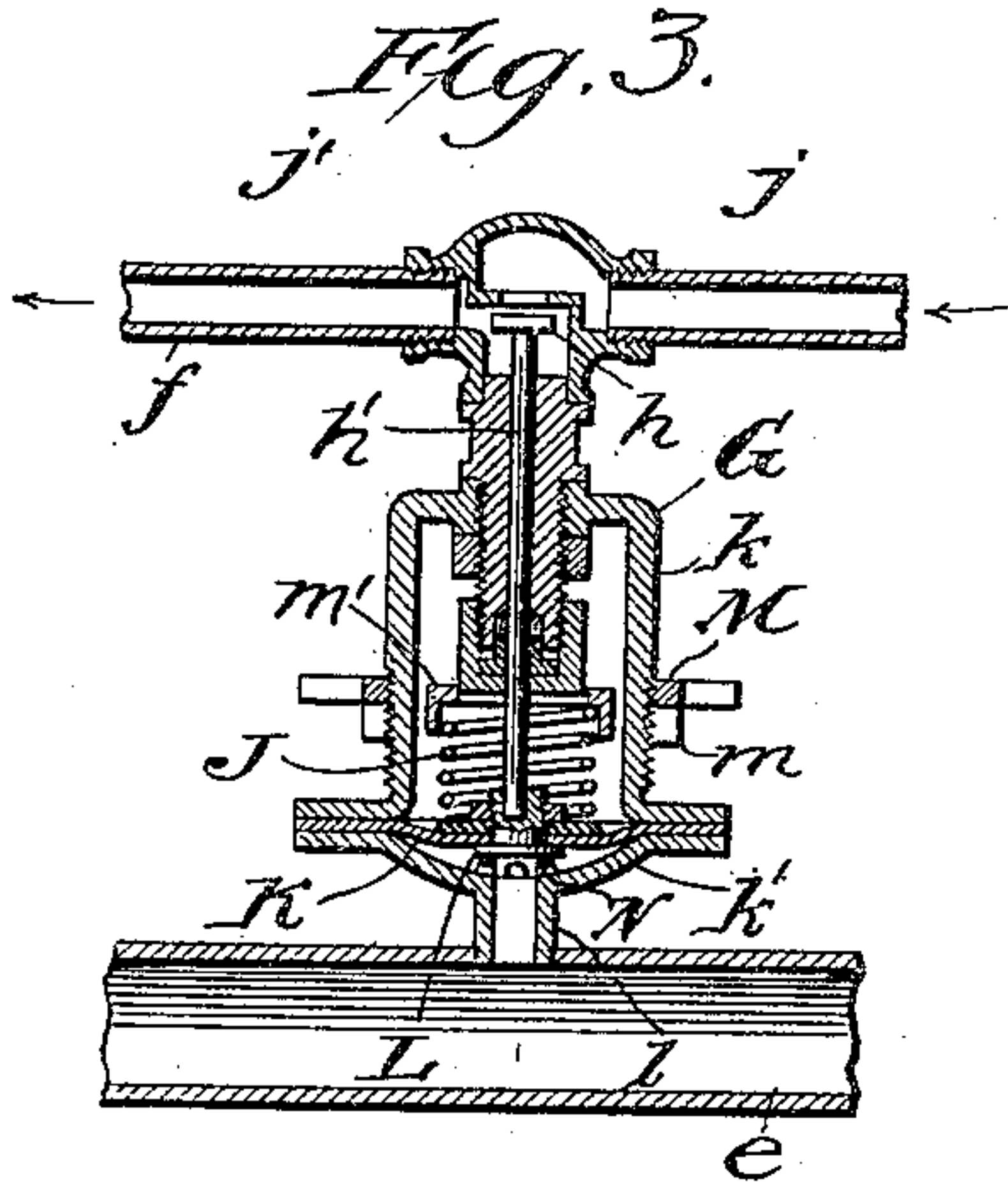
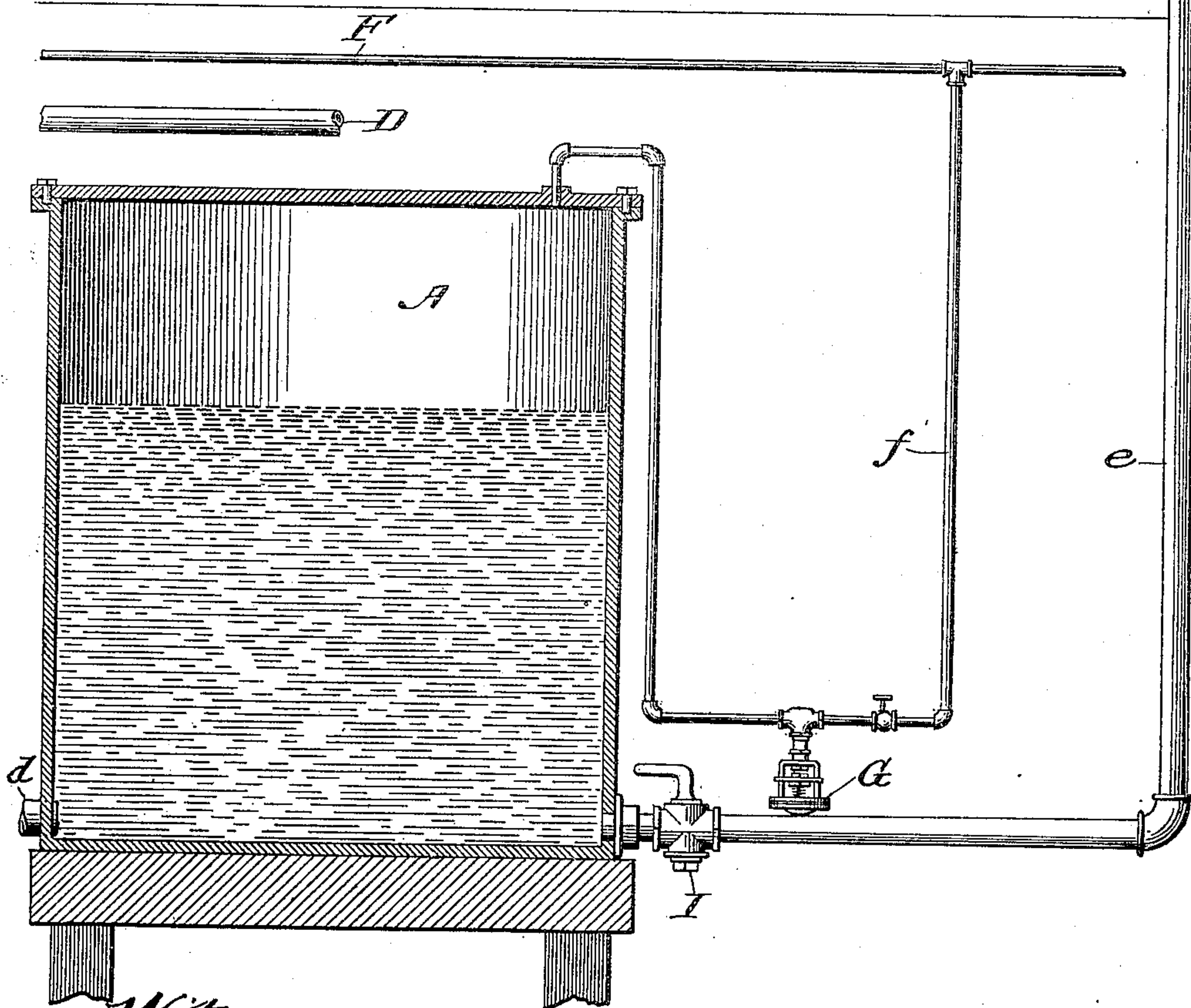


Fig. 2.

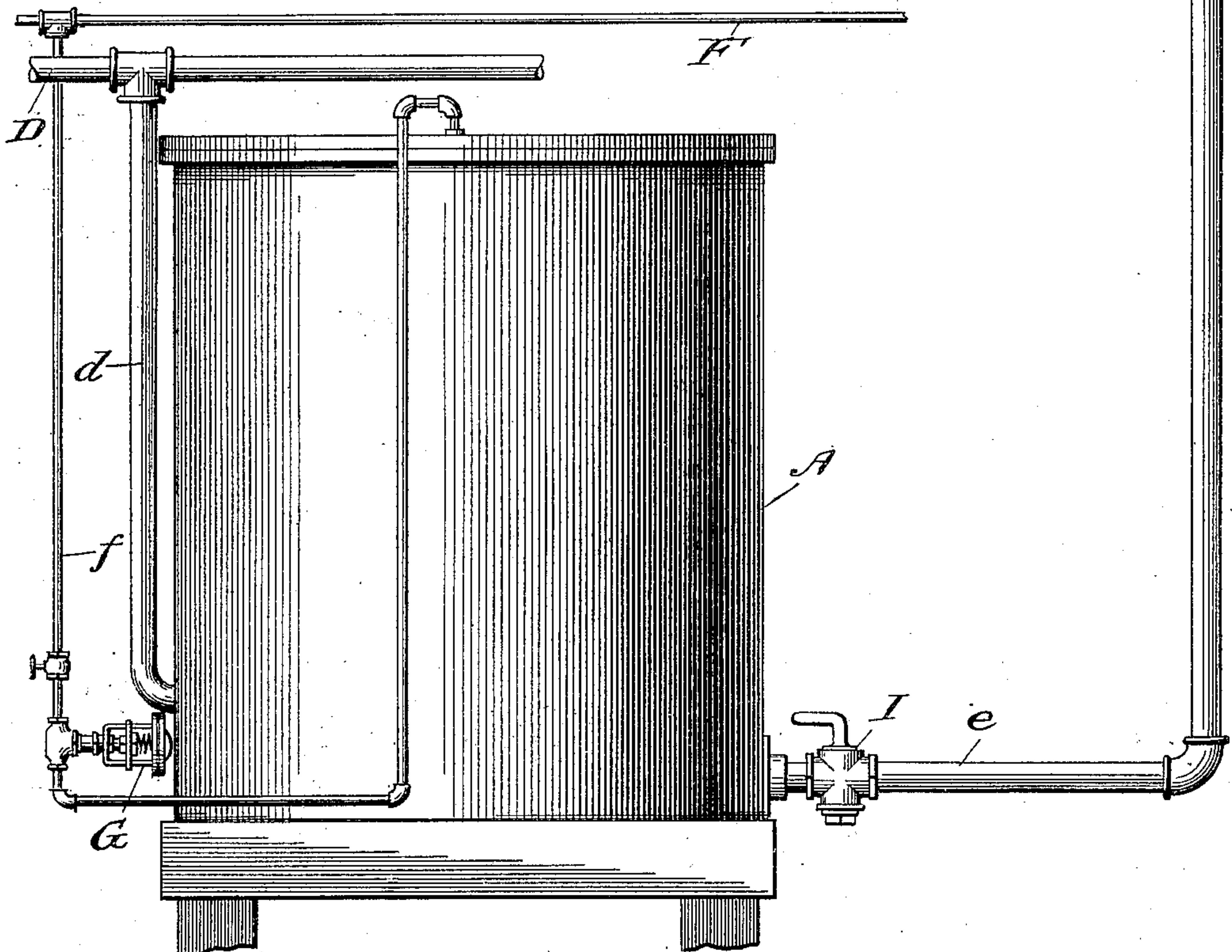
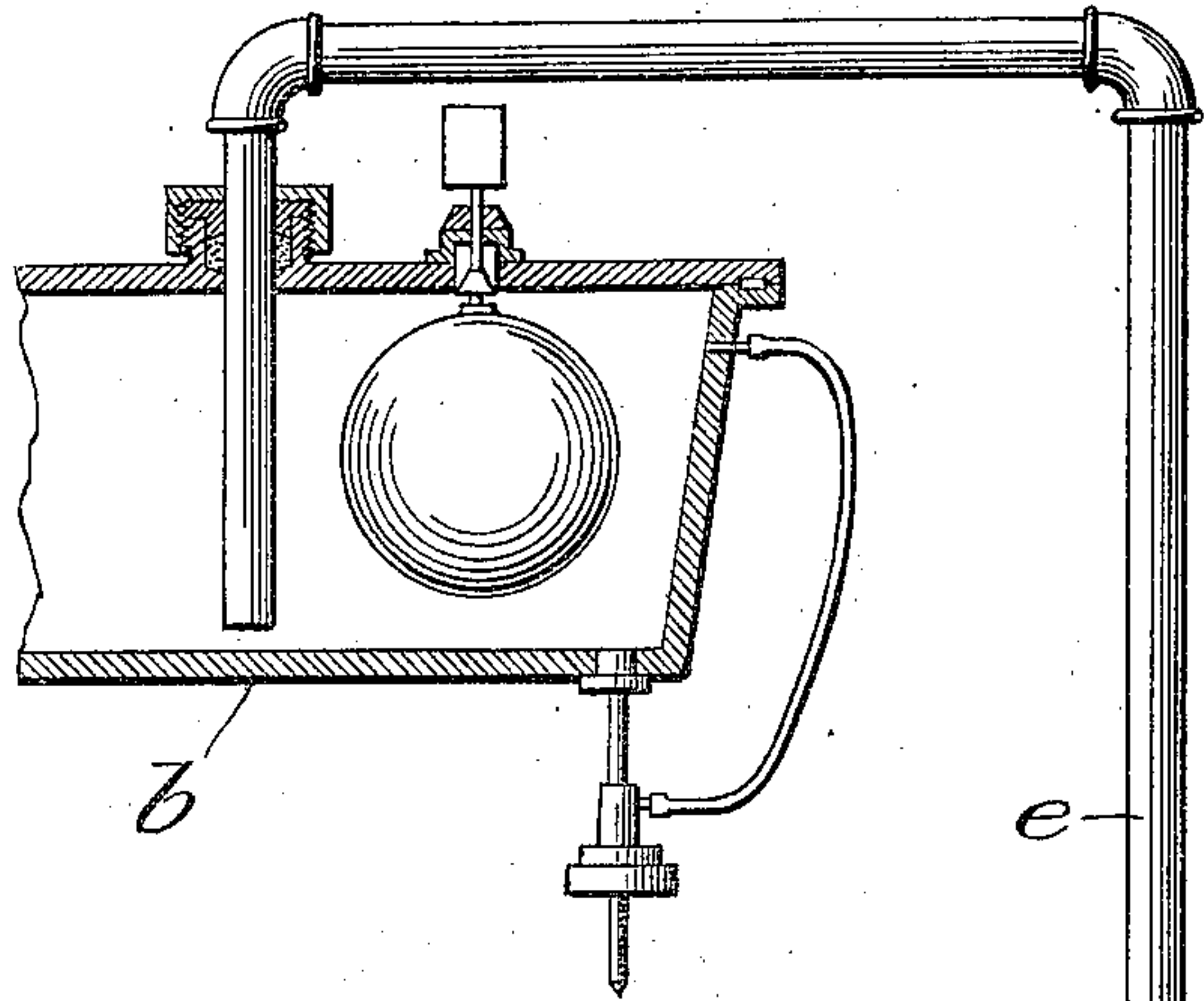


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934,956.

Fig. 4.



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UNITED STATES PATENT OFFICE.

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METHOD OF DELIVERING LIQUID.

934,956.

Specification of Letters Patent.

Patented Sept. 21, 1909.

Original application filed December 1, 1905, Serial No. 289,888. Divided and this application filed October 6, 1906. Serial No. 337,678.

To all whom it may concern:

Be it known that I, CHARLES L. BASTIAN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Methods of Delivering Liquid, of which the following is a specification.

This is a division of my application No. 289,888 filed December 1, 1905.

10 This invention relates to an improved method of delivering liquid which is especially adapted for breweries and bottling establishments, its object being to deliver the liquid to the head of a filling machine or a
15 racking machine at all times according to certain predetermined conditions of pressure and thereby avoid undue agitation of the liquid which tends to release the contained and enriching gases and to produce foam-
20 ing which is highly objectionable.

With this object in view my invention contemplates the automatic regulation of pressure in the supply vat to compensate for the loss of pressure consequent upon the low-
25 ering of the level of the liquid therein.

In the accompanying drawings of my invention Figure 1 is a diagrammatic view showing the invention embodied in a complete pipe line system. Fig. 2 is a sectional
30 view illustrating the invention. Fig. 3 is a sectional view of the regulating valve. Fig. 4 is a view, partly in section, illustrating another embodiment of the invention.

In the ordinary filling system the beer is
35 stored in bonded vats A on the floor below the filling machine B and the racking machine C and it is forced into the heads b, c of these machines by air pressure which is somewhat in excess of the pressure required
40 to raise the liquid to said heads. A main liquid inlet pipe D is provided with a valved branch d tapping each vat near its bottom and a main liquid outlet pipe E is similarly provided with a valved branch e tapped to
45 the bottom of each vat and valved branches e' connected to the heads of the filling and racking machines. A main air inlet pipe F has a valved branch f connected to the top of each vat.

50 The system thus far described is one commonly employed and it has been customary to increase the pressure in the vat once or twice during the filling operation for the purpose of providing sufficient pressure to de-

liver the liquid from the vat to the head of 55 the filling or racking machine. This system is open to all of the objections of a non-automatic system and furthermore it fails to provide a constant compensation for the loss of pressure due to the lowering of the level of 60 the liquid in the vat and the result has been that the liquid is delivered to the head under varying conditions which tend to produce foaming and otherwise seriously interfere with the filling operation. For illustration, 65 assuming that the filling machine is located about twelve feet above the supply vat and the latter has a capacity of 100 barrels and contains initially 80 barrels of beer. If an excess pressure of two pounds is provided in 70 the head of the filling machine, an initial air pressure of about ten pounds will be required in the vat. It will be readily understood that the pressure in the vat will decrease as the liquid is drawn off and delivered to the 75 head and the interruption to the evenness of flow thereby produced will be increased rather than avoided by the periodical increase of pressure. In fact it is the common occurrence that when the air pressure in the 80 tank is thus periodically increased the beer will be so greatly agitated for a while as to cause foaming and much trouble in the filling operation. This unevenness of flow will be wholly overcome by automatically in- 85 creasing the air pressure in the vat to constantly compensate for the loss of pressure due to the withdrawal of the liquid. I have accomplished this automatic regulation of the pressure in the vat by providing a regu- 90 lating valve G in the branch air pipe to each vat, this valve being operated and controlled by the pressure of the liquid. In Fig. 1 the regulating valve is located in the branch liquid outlet pipe between the vat and the 95 shut-off valve I; in Fig. 2 the regulating valve is located in the branch outlet pipe on the delivery side of the shut-off valve; in Fig. 4 the regulating valve is mounted directly on the vat close to the bottom thereof. 100

The regulating valve is illustrated in Fig. 3 and comprises a valve h carried by a stem h' and normally held by a spring J away from its seat j in the casting j'. A diaphragm K is clamped between the skeleton 105 frame k and the base k' and said base is shaped to provide a chamber L beneath the diaphragm and it has a nipple l which is

screw-threaded into the branch liquid outlet pipe *e*, as shown in Figs. 1 and 2, or into the vat, as shown in Fig. 4. The tension of the spring may be adjusted by a threaded ring
 5 M operating on the skeleton frame against arms *m* projecting outwardly from the plate *m'* against which the spring abuts. A stop N limits the movement of the valve under the influence of the spring. I make no claim
 10 in this application to the construction of this valve as the same forms the subject matter of an application No. 289,893 filed Dec. 1, 1905.

In the embodiments of the inventions illustrated in Figs. 1 and 2 the spring will hold the valve *h* normally unseated while the valve I is shut off and there is no pressure in the outlet pipe *e*. At this time the pressure in the vat will be of that degree previously determined as necessary to produce a proper flow of the liquid into the head of the filling machine when the valve I is first opened. When this valve I is opened the liquid will flow into the pipe *e* and to the
 25 head and also through the nipple *l* into the chamber L, and the pressure of the liquid will be sufficient to overcome the tension of the spring and seat the valve *h* to shut off the air supply. As the level of the liquid in
 30 the vat lowers and the pressure correspondingly decreases the spring will open the valve *h* to admit more air pressure into the vat to compensate for the loss of pressure due to the drawing off of liquid from the
 35 vat. This operation is entirely automatic in action and is repeated as conditions require to constantly maintain in the vat a sufficient pressure to deliver the liquid to the head of the filling machine under the predetermined
 40 conditions.

In the embodiments of the invention illustrated in Fig. 4 the valve operates in the same automatic manner heretofore described except that the pressure within the vat will
 45 hold the valve *h* normally seated. Any other suitable regulating valve may be employed and it may be located in any position where it will operate to automatically control the air supply to constantly maintain
 50 the required pressure in the vat.

The apparatus heretofore described for carrying out my improved system forms the subject matter of my application No. 289,888

herein before mentioned and is not claimed herein. It will be understood that any other
 55 apparatus suitable for the purpose may be employed instead of those forms illustrated in the drawings.

What I claim and desire to secure by Letters Patent is:

1. The method herein described of delivering beer from a supply vat to the head of a filling or racking machine at a constant pressure and with evenness of flow during the filling operation to avoid agitation and
 65 foaming, which method consists in providing an initial air pressure above the beer in the vat which, together with the weight of the beer, is sufficient to deliver the beer from the bottom of the vat at a predetermined
 70 pressure to the head, and then increasing the air pressure above the beer in the vat relatively to the lowering of the level of the beer by the pressure of the beer outside of the vat and without disturbing the beer to compensate for the loss of pressure due to the withdrawal of beer from the vat, whereby to deliver all the beer in the vat to the head of the filling or racking machine at the same pressure and without the loss of gas. 80

2. The method herein described of delivering beer from a supply vat to the head of a filling or racking machine at a constant pressure and with evenness of flow during the filling operation to avoid agitation and
 85 foaming, which method consists in providing an initial air pressure above the beer in the vat which, together with the weight of the beer, is sufficient to deliver the beer from the bottom of the vat at a predetermined pressure to the head, and then increasing the air pressure above the beer in the vat relatively to the lowering of the level of the beer by the pressure of the beer outside of the vat without disturbing the beer and controlling said
 95 increase of air pressure by the pressure of the beer to compensate for the loss of pressure due to the withdrawal of beer from the vat, whereby to deliver all the beer in the vat to the head of the filling or racking machine at the same pressure and without loss of gas. 100

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Witnesses:

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