

No. 872,076.

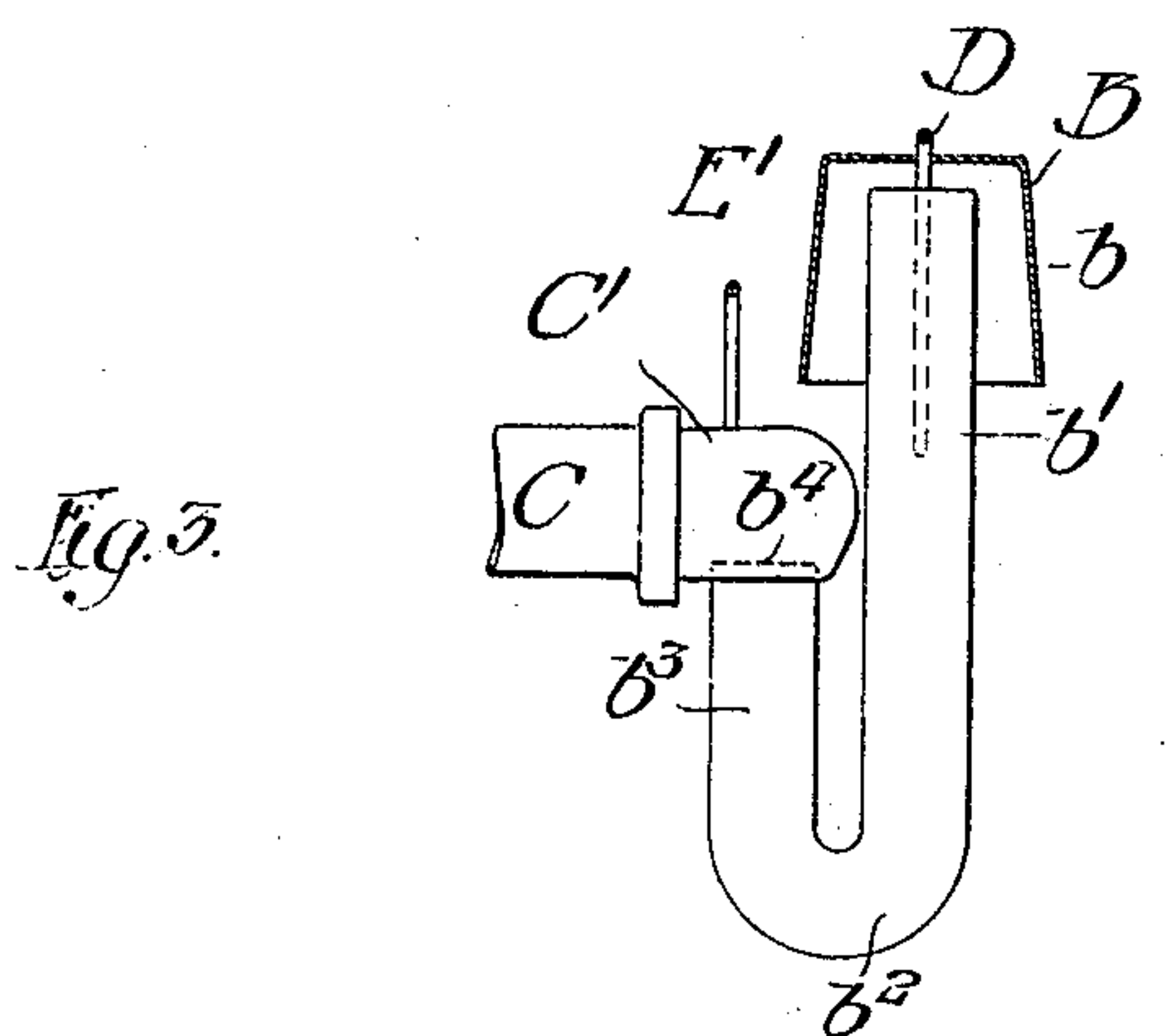
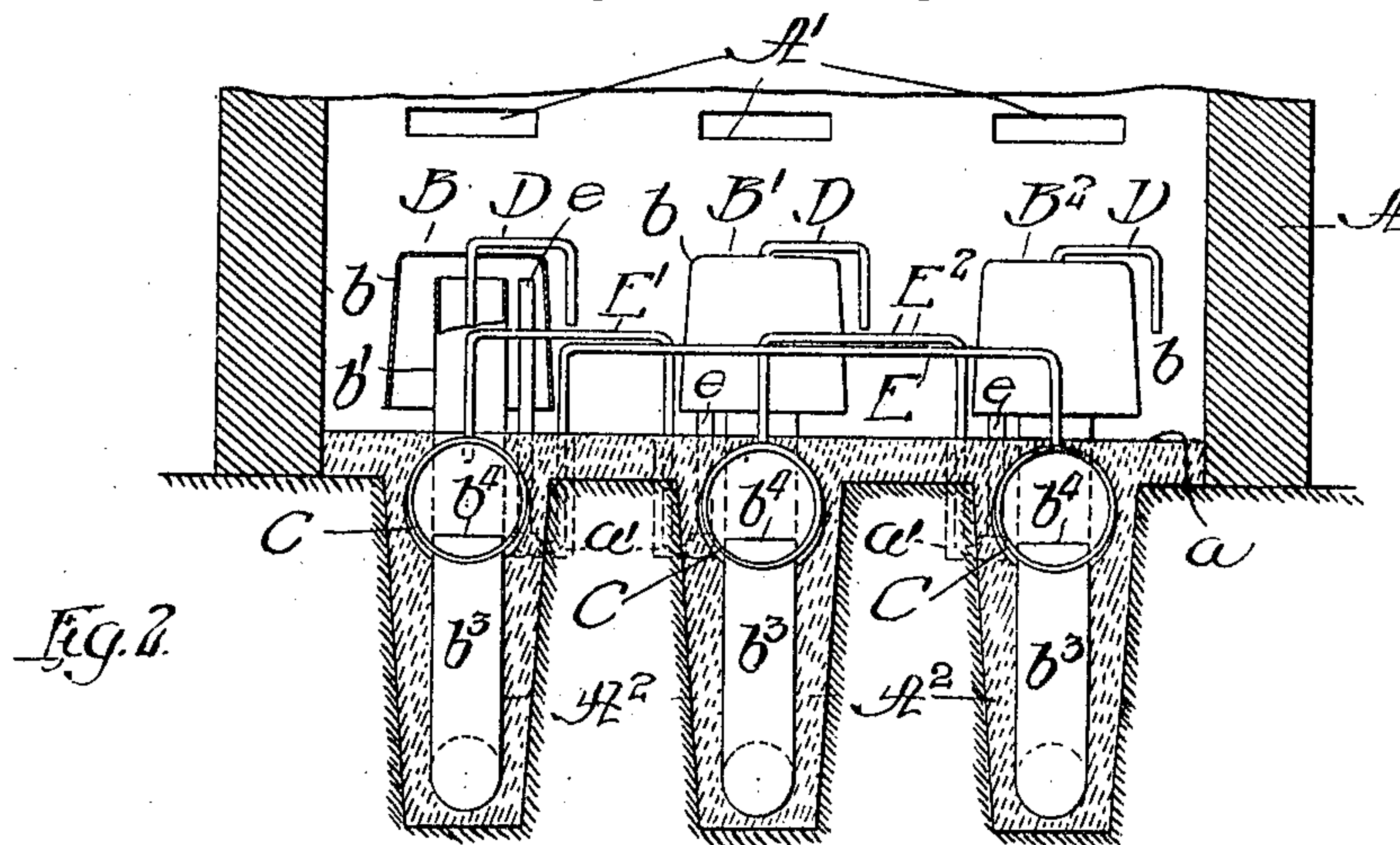
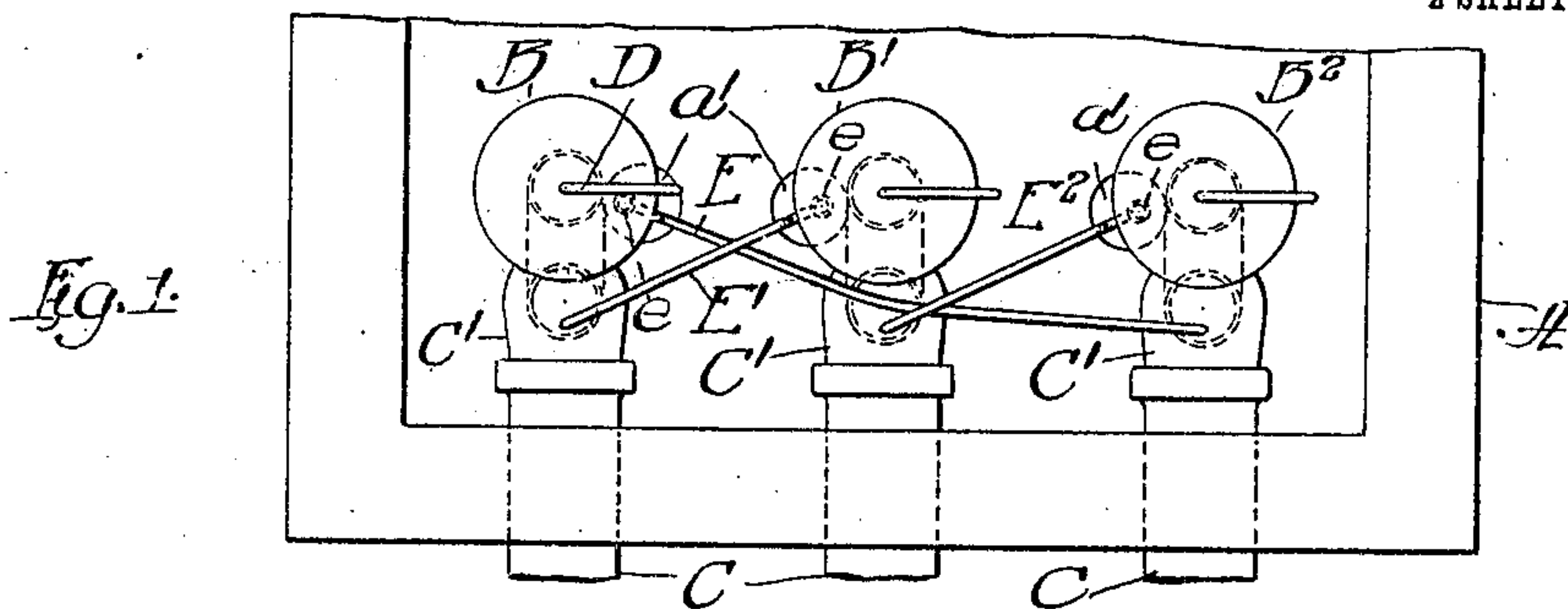
PATENTED NOV. 26, 1907.

S. W. MILLER.

ALTERNATING SIPHON.

APPLICATION FILED OCT. 25, 1906.

2 SHEETS—SHEET 1.



Witnesses:
J. H. Alden
W. B. Hall

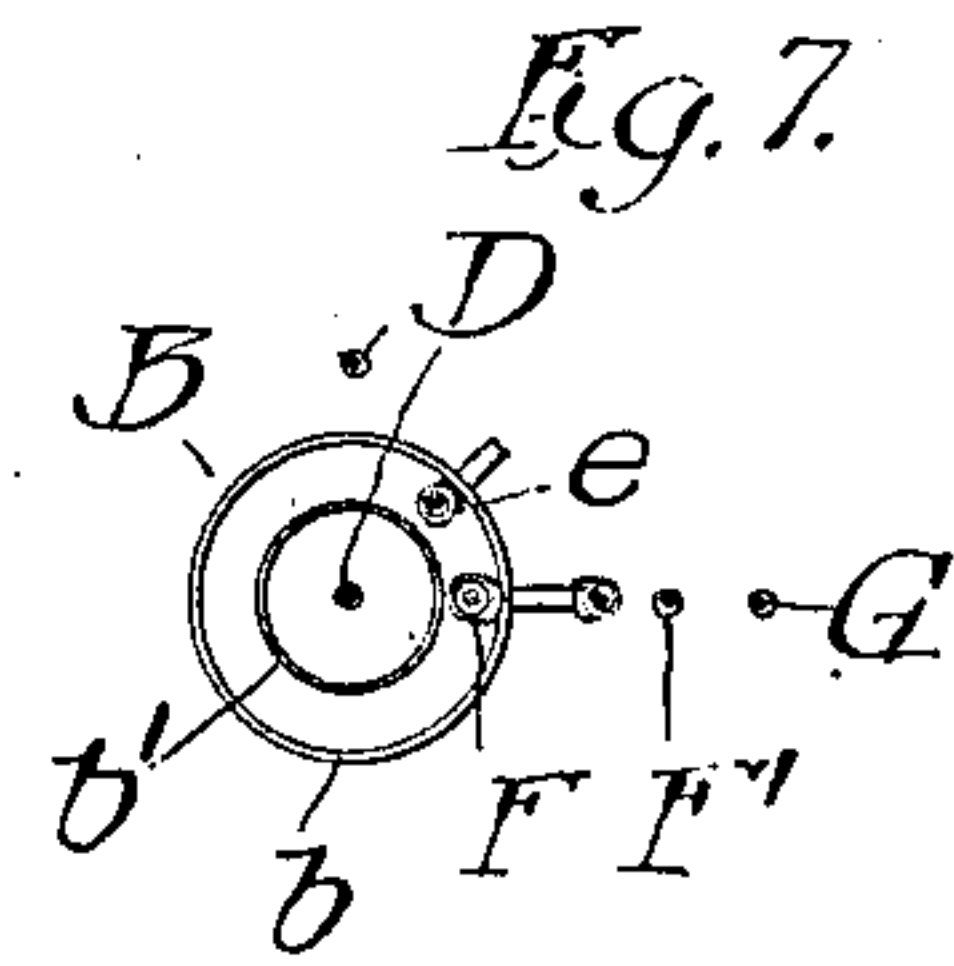
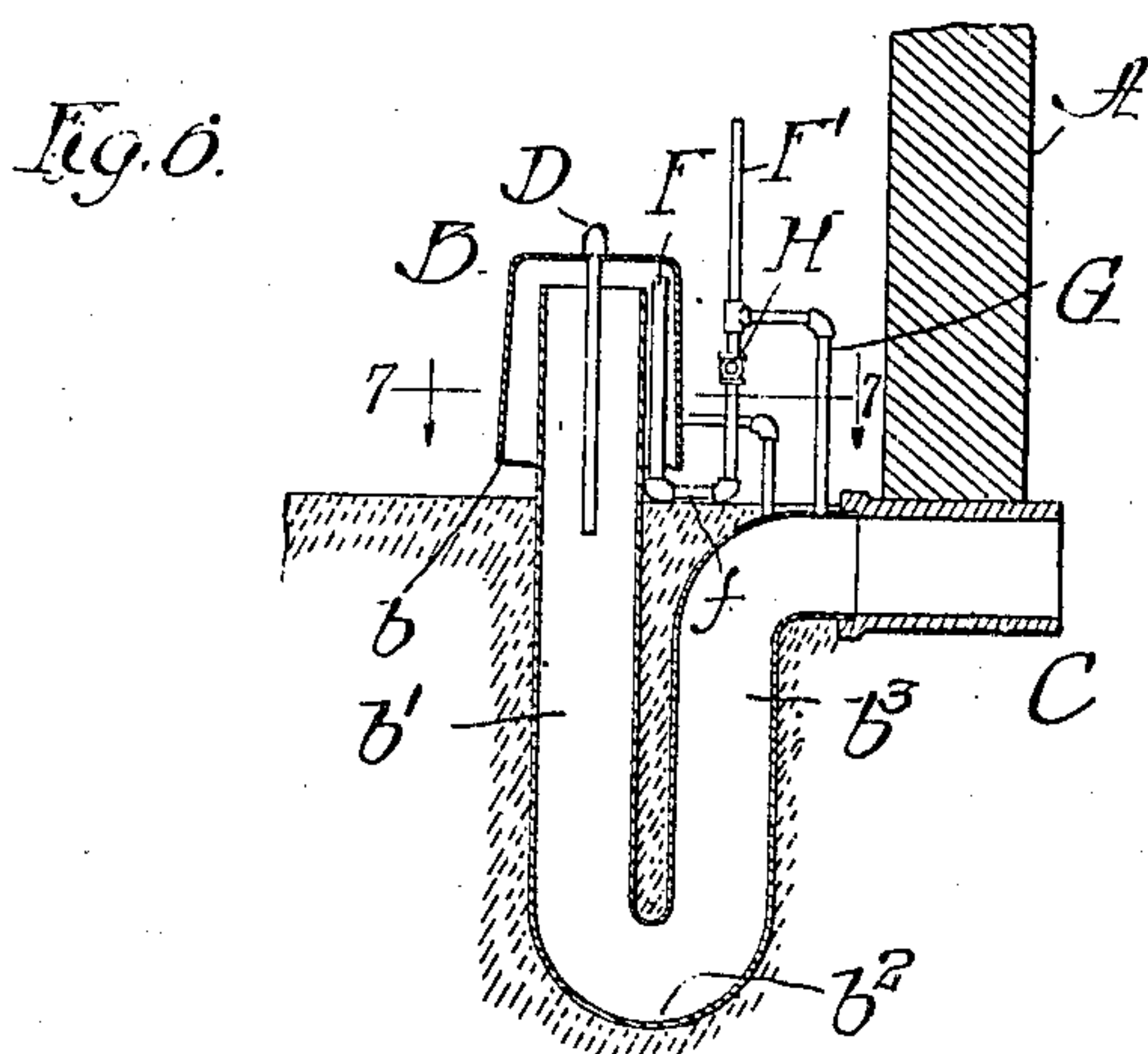
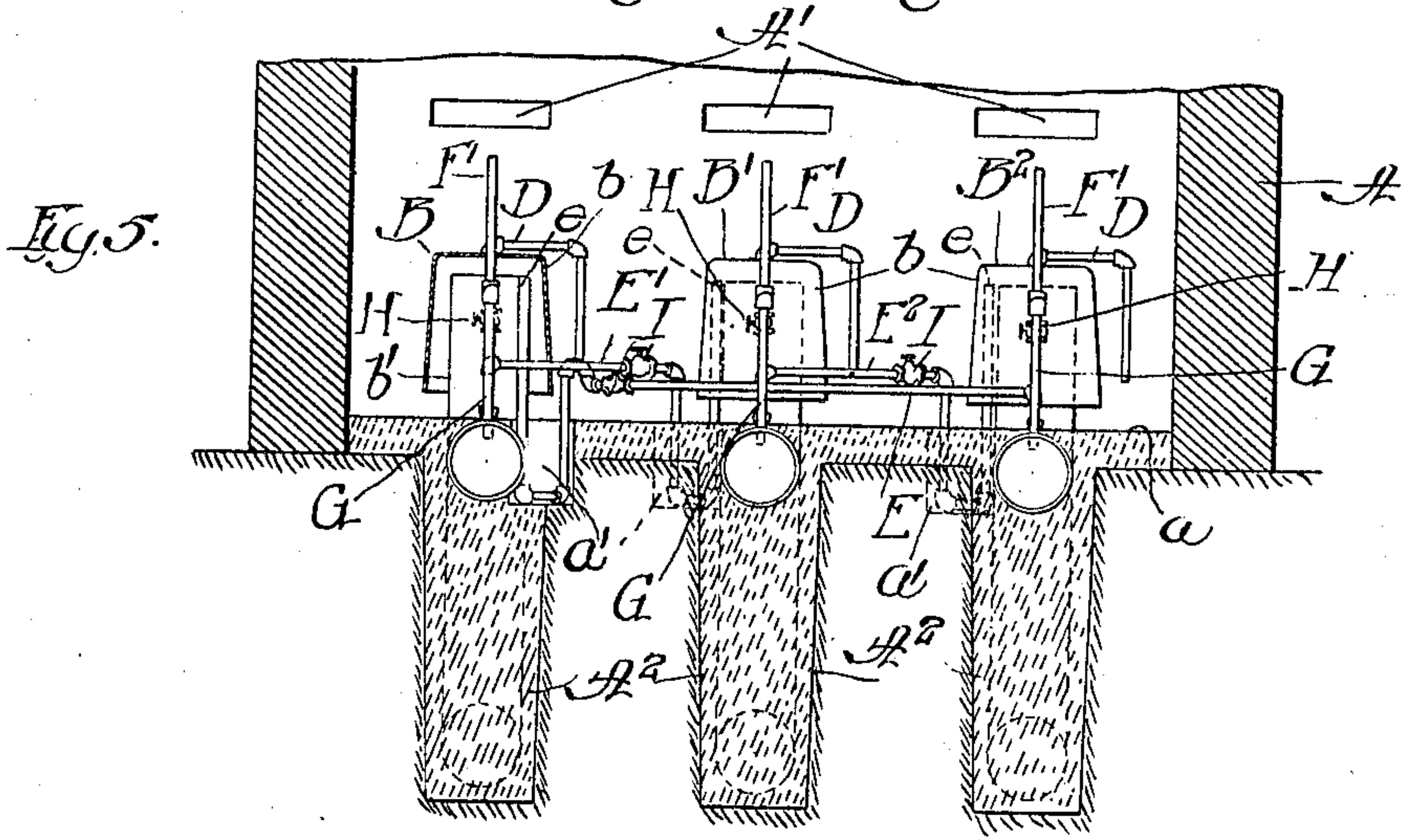
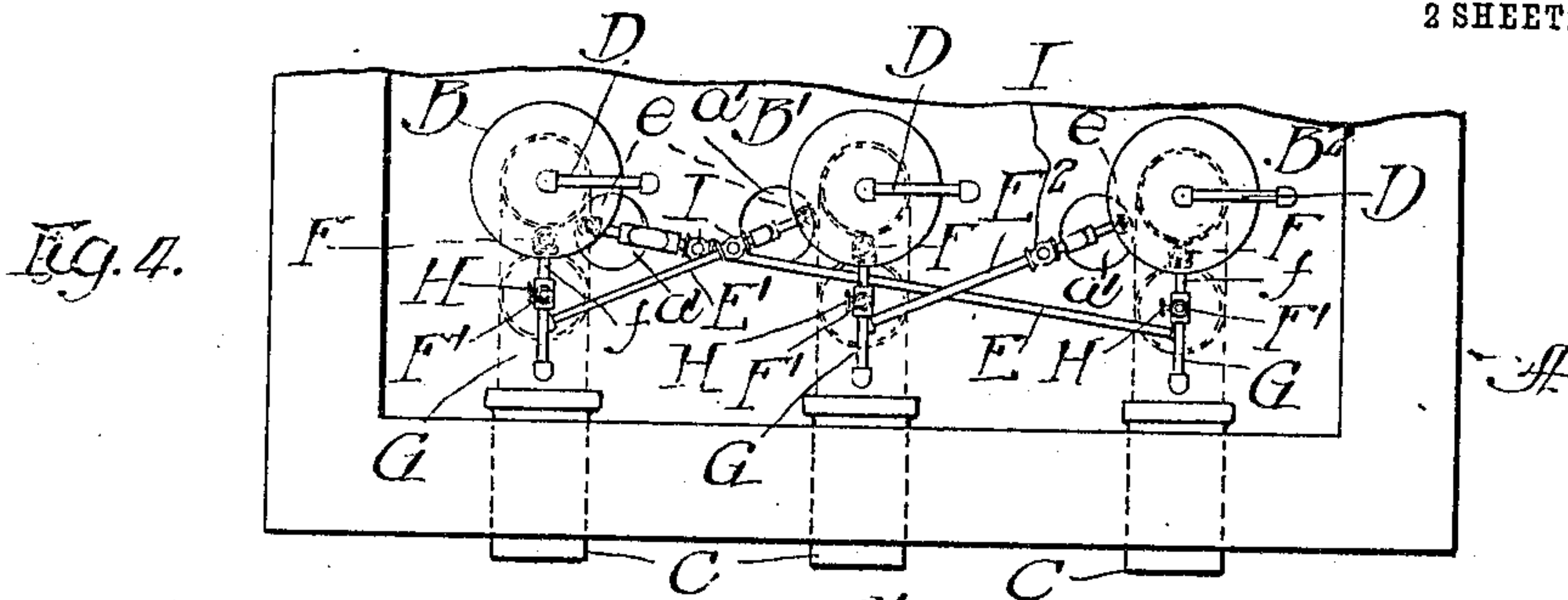
Inventor
Sidney W. Moller
by Paul Brown
his Atty.

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2 SHEETS—SHEET 2.



Witnesses:
J. H. Alfred
W. Hall

Inventor:
Sidney W. Miller
by Paul Brown
his Atty.

UNITED STATES PATENT OFFICE.

SIDNEY W. MILLER, OF CHICAGO, ILLINOIS.

ALTERNATING SIPHON.

No. 872,076.

Specification of Letters Patent.

Patented Nov. 26, 1907.

Application filed October 25, 1906. Serial No. 340,575.

To all whom it may concern:

Be it known that I, SIDNEY W. MILLER, a citizen of the United States, of Chicago, in the county of Cook and State of Illinois, have
5 invented certain new and useful Improvements in Alternating Siphons, (Case A;) and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked
10 thereon, which form a part of this specification.

This invention relates to improvements in apparatus designed for controlling the flow
15 of liquid from a main tank to a plurality of tanks or receptacles, and so arranged that the plurality of receptacles may be filled or charged in a predetermined rotative order from said main or central tank and relates
20 also to improvements in siphon apparatus.

My improved controlling apparatus may be used wherever it is desired to distribute liquid from a central tank in a predetermined or rotative order to a plurality of
25 tanks or receptacles or other places for the disposal of the liquid.

The invention is especially applicable for use in connection with that type of sewage purifying systems wherein the sewage is sub-
30 jected to preliminary septic treatment. My improved apparatus in this use thereof is designed to be located between the septic tank and the contact or filter beds, to receive the sewage from the septic tank and properly
35 distribute it upon said beds.

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

As shown in the drawings:—Figure 1 is a
40 partial top plan view of a central or distributing tank, showing also in top plan view the siphonic apparatus for emptying the tank. Fig. 2 is a vertical section thereof. Fig. 3 is a vertical section of one of the si-
45 phons, taken in a plane at a right angle to that shown in Fig. 2. Fig. 4 is a view similar to Fig. 1, illustrating a modification of the siphonic apparatus. Fig. 5 is a vertical section thereof. Fig. 6 is a vertical section of
50 one of the siphons shown in Fig. 5, taken in a plane at right angles to that of Fig. 5. Fig. 7 is a horizontal section taken on line 7—7 of Fig. 6.

First referring to the construction shown in Figs. 1 to 3, inclusive, A designates a tank, 55 which may be termed a dosing or central distributing tank. It receives liquid through inlet openings A¹. The liquid contents of said tank is discharged therefrom into a plurality of receptacles (not shown) through the
60 medium of a plurality of deep seal siphons B B¹ B² which are arranged, as herein shown, in a line near one wall of the tank. This arrangement may, however, be varied so long as the relation of the predetermined order
65 of operation, hereinafter to be described, is maintained. The inlet leg *b* of each siphon consists of a downwardly opening bell which is supported over the upper end of the outlet leg *b*¹ of the siphon in any familiar or well
70 known manner. Said outlet leg of each siphon communicates with and discharges the liquid through a deep seal trap, indicated as a whole by *b*², having an upturned outlet end *b*³ that communicates with an outlet pipe
75 or conduit C leading to any suitable place for the disposal of the liquid. The siphon herein shown is of that type illustrated in my prior United States Letters Patent No. 449,083, granted on the 24th of March, 1891. 80 In this type of siphon, the outlet leg of the trap is connected with the pipe or conduit C through the medium of a fitting C¹ and said fitting is equipped with a lip *b*⁴ that extends above the lower wall thereof for the purpose
85 described in my aforesaid Letters Patent. In the present instance, said lip is formed by extending the upper end of the outlet leg of the trap above the lower wall of the fitting, as shown in Fig. 3. Said siphons are pro-
90 vided with the usual vent pipes D and the deep seal traps thereof are embedded in a concrete foundation A² which supports, or the upper part of which constitutes, the floor of the tank. The said siphons are designed
95 to operate in a predetermined rotative order to empty the contents of the tank A through the several pipes or conduits C in a generally similar manner to that illustrated in the prior U. S. patent to Adams, No. 760770, granted
100 May 24th, 1904, wherein but one siphon operates at a time, and wherein also the scales of all the idle or non-operating siphons, save one, are strengthened by the diversion of liquid to the traps thereof, the operating siphon
105 filling its own trap. The tank A when again

filled is emptied through the siphon having the weakened seal. This rotative order of operation, when once established, continues throughout the operation of the apparatus.

5 Among the objects of the present invention is to improve the operation of an apparatus of this character, to produce a construction wherein the pipe equipment for diverting liquid to the traps of the siphons may be readily and easily applied to siphons already set in place, and further to provide a construction wherein the repair or replacing of said pipe equipment may be readily effected without disturbing the setting of the siphons.

10 It is customary in installing apparatus of this character, that the siphons themselves be set in the tank by the general contractor who erects the fluid distributing plant, while the auxiliary equipment which supplements the usual operation of the siphons to change or amplify such usual operation or function of the siphon is installed by a sub-contractor or person making such auxiliary equipment. It is, therefore, of considerable practical importance that such equipment may be placed regardless of accurate setting of the siphons and that repairs may be made without disturbing the setting of the siphons.

Each siphon is connected by a liquid diverting pipe with the outlet leg b^3 of a trap belonging to another siphon of the series, so that during the flow of liquid through one siphon a portion of said liquid is diverted to the trap of another siphon to strengthen the seal thereof. As herein shown, the receiving ends of said liquid diverting pipes extend into and receive liquid from the bells or shorter legs of the siphons. Said pipes are designated by $E E^1 E^2$, the pipe E connecting siphon B with the trap of siphon B^2 ; the pipe E^1 connecting siphon B^1 with the trap of siphon B , and the pipe E^2 connecting siphon B^2 with the trap of siphon B^1 . The receiving end e of each pipe extends vertically into the bell at one side and terminates near the open end of the longer leg of the siphon. In order to afford an ample depth of seal to prevent air pressure in the siphons being released through the diverting pipes, the receiving ends of said pipes extend downwardly into recesses a^1 in the floor a of the tank and thence upwardly to the main portions of the pipe, which latter are located above the floor of the tank. This arrangement provides U-shaped traps, the seals of which are deeper than those of the main trap of the siphon. It will, of course, be understood that other arrangements may be made to properly seal said liquid diverting pipes for the purpose set forth.

Before the tank A is filled the traps of the several siphons are partially filled. Upon the filling of said tank, one of the siphons operates to empty the tank before the seals of

the other siphons are forced for the reason set forth in said prior patent to Adams. After the tank is emptied through said first operating siphon, the liquid flowing thereinto fills the trap of said siphon. The traps of the other siphons are however, in the usual operation of the siphons, and without the use of the auxiliary equipment herein described, only partially full by reason of the fact that no liquid from the tank has flowed into or through said latter siphons. By reason of the connections of said siphons by the pipes $E E^1 E^2$, however, the traps of one of the idle siphons, to wit, the trap connected by one of said pipes $E E^1 E^2$ with the operating siphon is filled to a like extent as the trap of the last operated siphon, leaving the remaining idle siphon. (when but three siphons are employed) with a partially full trap and therefore a weakened seal. The latter siphon will therefore be the next to be brought into operation to empty the tank, and during its emptying operation liquid is diverted therefrom to the trap of that one of the siphons connected therewith by one of the pipes $E E^1 E^2$. It will be observed, by reference to the drawings, that the placing of said connecting pipes $E E^1 E^2$ principally above the floor of the tank, not only materially facilitates the installation of this part of the equipment in the apparatus, but also simplifies repairing and replacing of said pipes. Moreover, the pipe equipment may be more readily applied to the siphons after they have been set, than in the said Adams construction, inasmuch as the receiving ends thereof are free to adjust themselves to considerable variations of the siphons from such accuracy of setting as is required in the Adams construction. In other words, it will be noted that, while the discharge ends of each of the pipes $E E^1 E^2$ has practically a rigid connection with the trap of the other siphon into which it discharges, the receiving end is free from such restricted or rigid attachment.

The construction shown in Figs. 4 to 7, inclusive, embraces the general features of construction and operation described in connection with the other figures. In the construction shown in Figs. 4 to 7, however, the siphons are provided with blow-off traps having a less depth of seal than the deep seal traps through which the siphons empty. One leg F of each blow-off trap extends upwardly into the bell or receiving leg of the associated siphon slightly above the receiving end of the outlet leg of the siphon, and the other leg F^1 , connected at its lower end with the lower end of the leg F by a short transverse pipe f , extends upwardly outside of the bell above the maximum liquid level of the tank A . The outside leg F^1 of each blow-off trap is provided with a drain pipe G which discharges the liquid from said trap to the outlet

leg of the main trap of the siphon, as more clearly shown in Fig. 6. The depth of seal of the blow-off traps is fixed by the distance between the lower connecting pipe *f* and the level of the receiving end of the overflow of drain-pipe *G*, it being evident that the liquid rises no higher in said pipe *F*¹ than the level of said receiving end of the overflow or drain-pipe. The pipe *F*¹ extends beyond the connection thereof with the drain-pipe above the maximum liquid level of the tank in order to furnish a free avenue of escape for the air imprisoned in the siphon at the time of release of the air through said blow-off trap, though in some instances, the air may be discharged through the drain pipe. In practice, the release of the air through the blow-off trap acts to discharge practically all of the liquid from the trap through the upper open end thereof. The blow-off trap is filled during the emptying operation of the siphon through the receiving leg *F* thereof, and said latter leg is made of ample diameter to insure a proper filling of the trap. The blow-off trap just described is capable of application to siphons for general use as is obvious. The arrangement for effecting and maintaining a predetermined rotative emptying order of the siphons, shown in Figs. 4, 5 and 6, is the same however as that of the other type of siphon before described and like parts are designated by the same reference letters. The extension of the inner legs of the blow-off traps above the receiving upper ends of the longer legs of the siphons insure that the pressure in the siphons will be sufficiently reduced to start the siphons into action before the liquid shall find its way into said blow-off traps.

In the construction last described, one of the siphons may be cut out of the operative series while the other two siphons will operate alternately in the same manner as will two independent siphons located in a tank operate to alternately empty the tank, such for instance as shown in the prior United States patent to Adams, No. 646339, granted on the 27th day of March 1900. For this purpose, the outer legs *F*¹ of the blow-off traps or the drain-pipes *G* thereof are provided with valves *H*, while the pipes *E* *E*¹ *E*² are provided with like valves *I*. In order to cut off one of the siphons from the operating series, the valve *H* connected with its blow-off trap is closed and the valves *I* of the diverting pipe *E* *E*¹ *E*² are closed.

I may employ adjustable blow-off traps such as illustrated in my co-pending application for United States Letters Patent Serial No. 337,961, filed October 8th, 1906. In this event the valves *H* will be located in the horizontal portions of the drain-pipes instead of in the outlet legs of the blow-off traps. The said valve *H* may, in the construction

herein illustrated, be so located in the drain pipe *G*, inasmuch as it is obvious that the closing of the valve in such construction will cut off the drain from the trap, whereby liquid will be forced upwardly into the outlet leg of the trap beyond said drain pipe. In this manner the seal of the trap so closed off is of such strength relatively to the normal depth of seals of the blow-off traps that the trap so cut out will not be forced.

It will be observed that it is not essential that the deep traps of the siphons be entirely filled by water diverted through the pipes *E* *E*¹ *E*², it only being necessary that such a quantity of liquid shall flow from a diverting pipe into the associated deep trap, as to strengthen its seal as compared to the seal of the other idle siphon, so as to insure that the latter siphon will be the next to operate.

I claim as my invention:—

1. The combination with a liquid tank, of a plurality of deep trapped siphons for emptying the tank and a liquid diverting pipe leading from each siphon to the trap of another siphon, said pipes being located with the principal parts thereof above the levels of the intake limbs of said siphons.

2. The combination with a liquid tank, of a plurality of deep trapped siphons for emptying the tank and a liquid diverting pipe leading from each siphon to the trap of another siphon, the discharge ends of said pipes being connected rigidly to said traps and the receiving ends thereof having free or loose connection with the siphons.

3. The combination with a liquid tank, of a plurality of deep trapped siphons for emptying the tank, and a liquid diverting pipe leading from each of the siphons to the trap of another, said pipes being located principally above the floor of the tank and the discharge ends of said pipes being connected rigidly with said traps and having free or loose connection at their receiving ends with the siphons.

4. The combination with a liquid tank, of a plurality of trapped siphons for emptying the same, of a liquid diverting pipe leading from each siphon to the trap of another siphon, said pipes being located principally above the floor of the tank, the floor of the tank being provided with upwardly opening recesses and the pipe being provided with trapped portions which occupy said recesses.

5. The combination with a liquid tank, of a plurality of trapped siphons for emptying the tank, and liquid diverting pipes located principally above the floor of the tank, each provided with a receiving end which enters freely the shorter limb of one siphon and is connected rigidly to the trap of another siphon.

6. The combination with a liquid tank, of a plurality of trapped siphons for emptying

- the tank, and liquid diverting pipes each provided with an upturned receiving end which extends into the shorter leg of one siphon and is connected at its discharge end
- 5 with the trap of another siphon, the floor of the tank being provided with upwardly opening recesses and said pipe being provided with trapped portions which occupy said recesses.
- 10 7. The combination with a liquid tank, of a plurality of trapped siphons for emptying the tank, blow-off traps communicating with the air spaces of said siphons, and liquid diverting pipes each receiving liquid from the
- 15 shorter leg of one of the siphons and discharging the liquid into the trap of another siphon.
8. The combination with a liquid tank, of a plurality of trapped siphons for emptying
- 20 the tank, blow-off traps communicating with the air spaces of said siphons, and liquid diverting pipes, each receiving liquid from the shorter leg of one of the siphons and discharging into the trap of another siphon,
- 25 said liquid diverting pipes being connected rigidly at their discharge ends with the traps of said siphons, and having free or loose connection at their receiving ends with the siphons.
- 30 9. The combination with a liquid tank, of a plurality of trapped siphons for emptying the tank, blow-off traps associated with the shorter legs of the said siphons and having a depth of seal less than that of the main traps
- 35 of the siphons, liquid diverting pipes each

receiving liquid from one of the siphons and discharging the liquid into the trap of another siphon, and means for cutting one of the siphons out of the operative series.

10. The combination with a liquid tank, of 40 at least three siphons having trapped discharge legs for emptying the tank, means acting during the flow of one siphon for diverting liquid therefrom to the trap of another siphon, and means for cutting one of 45 the siphons out of the operative series.

11. The combination with a liquid tank, of at least three siphons having trapped discharge legs for emptying the tank, means acting during the flow of one siphon for di- 50 verting liquid therefrom to the trap of another siphon, and means for cutting one of the siphons out of the operative series, embracing valves in the liquid diverting pipes.

12. The combination with a liquid tank, of 55 at least three siphons having trapped discharge legs for emptying the tank, a liquid diverting pipe leading from each siphon to the trap of another siphon, blow-off traps for controlling the operation of said siphons, 60 and valves in the liquid diverting pipes and blow-off traps.

In testimony, that I claim the foregoing as my invention I affix my signature in the presence of two witnesses, this 11th day of Octo- 65 ber A. D. 1906.

SIDNEY W. MILLER.

Witnesses:

WILLIAM L. HALL,
T. H. ALFREDS.