

No. 636,610.

Patented Nov. 7, 1899.

S. H. ADAMS.

SIPHON.

(Application filed Apr. 24, 1899.)

(No Model.)

FIG. 1.

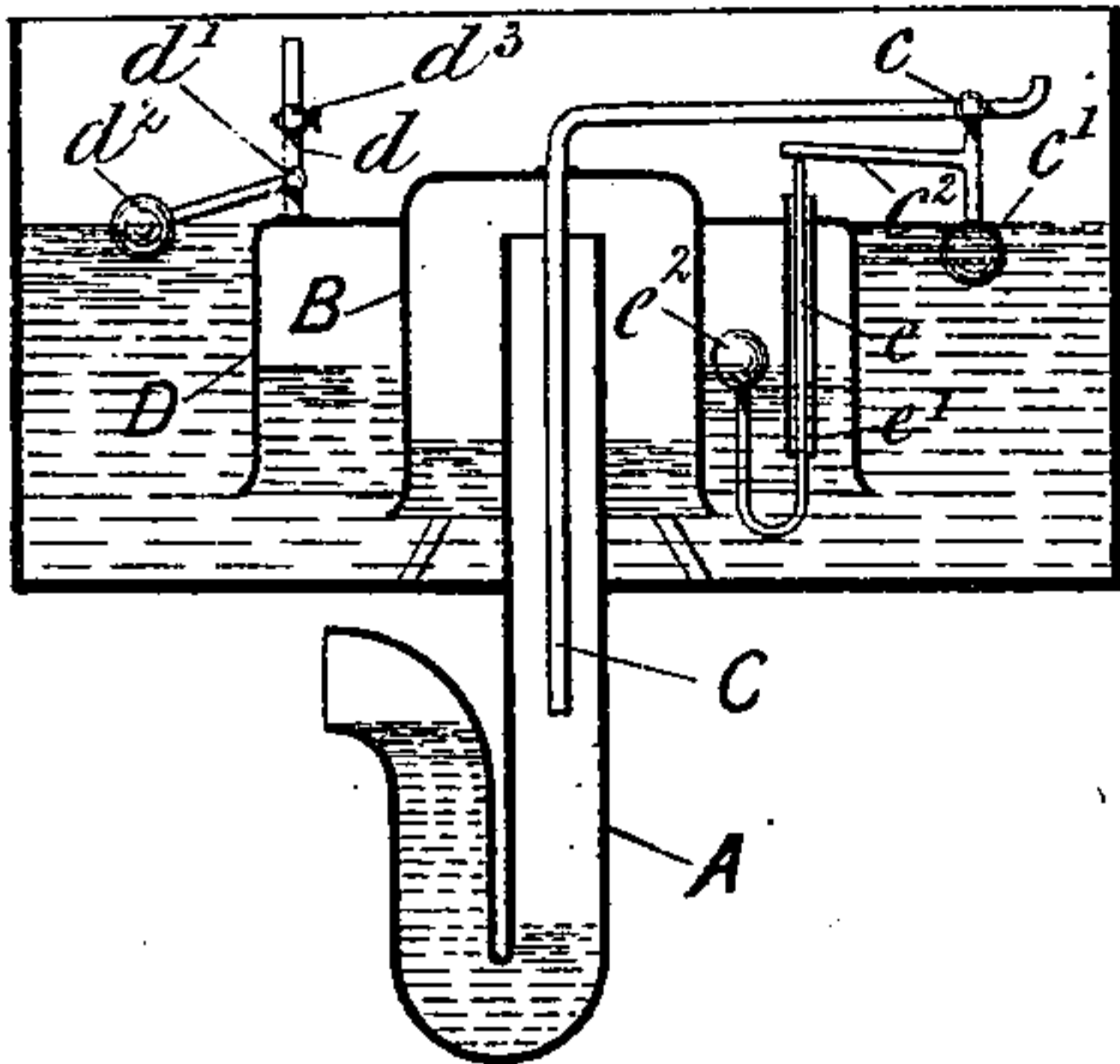


FIG. 2.

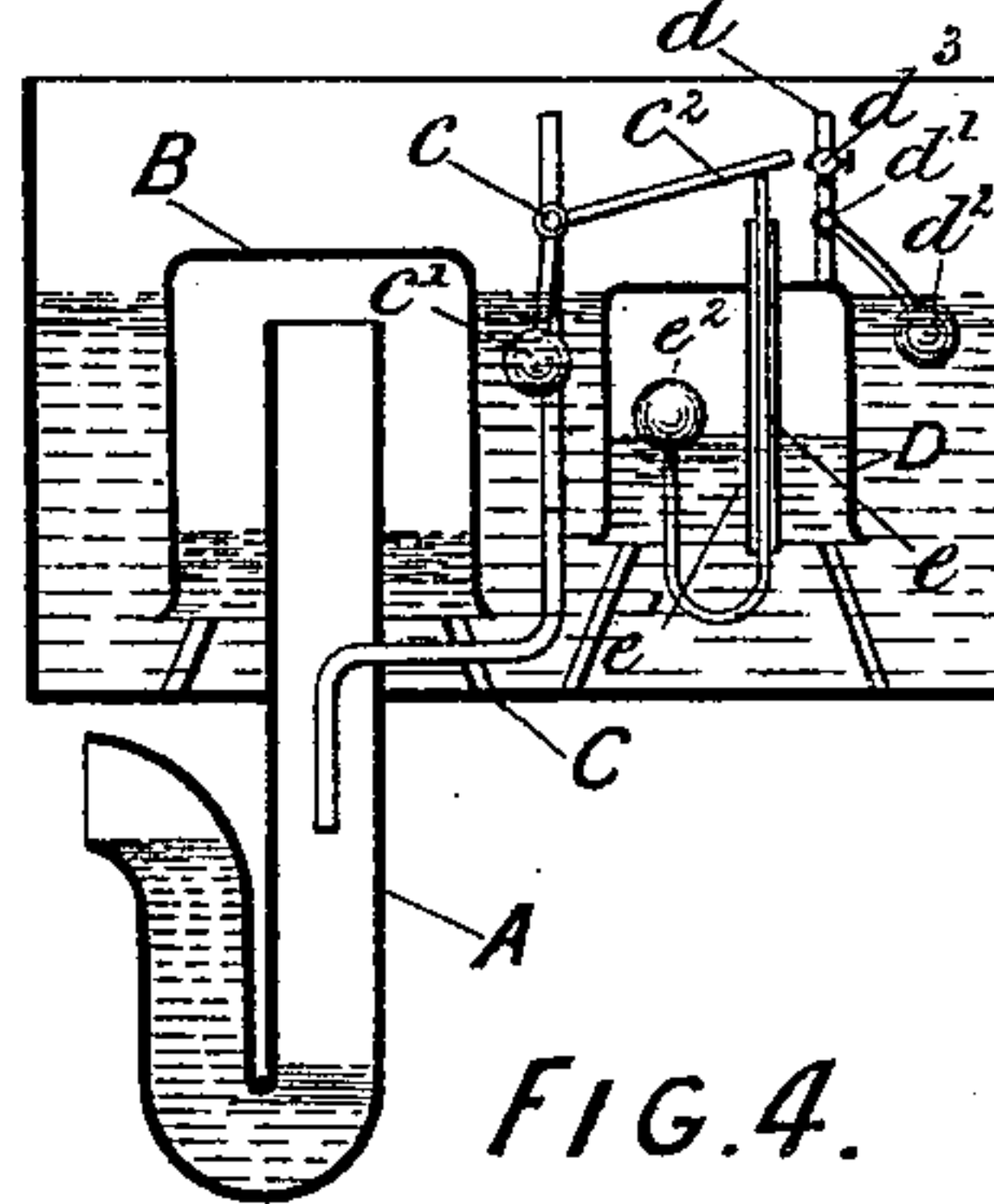


FIG. 4.

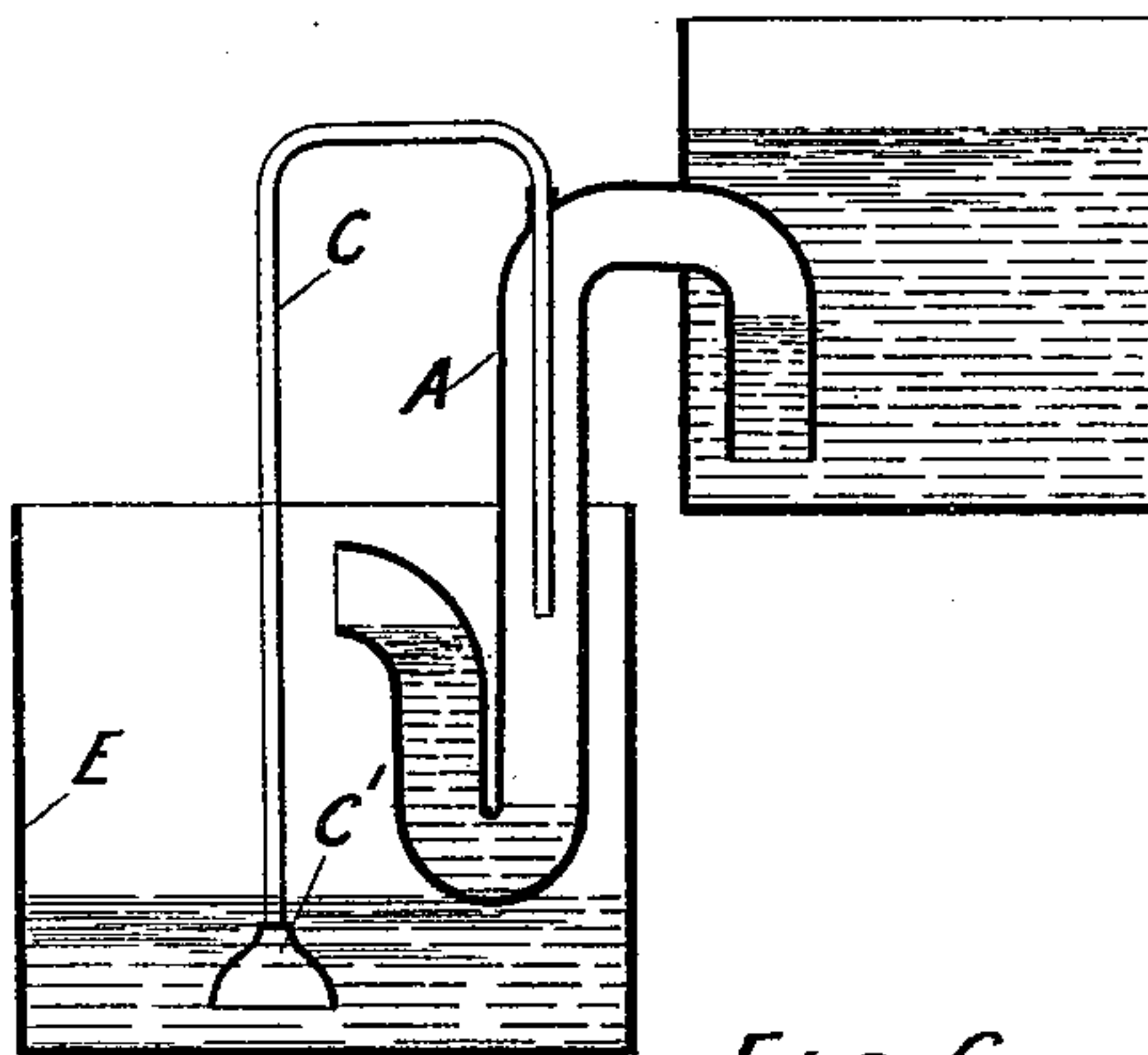


FIG. 3.

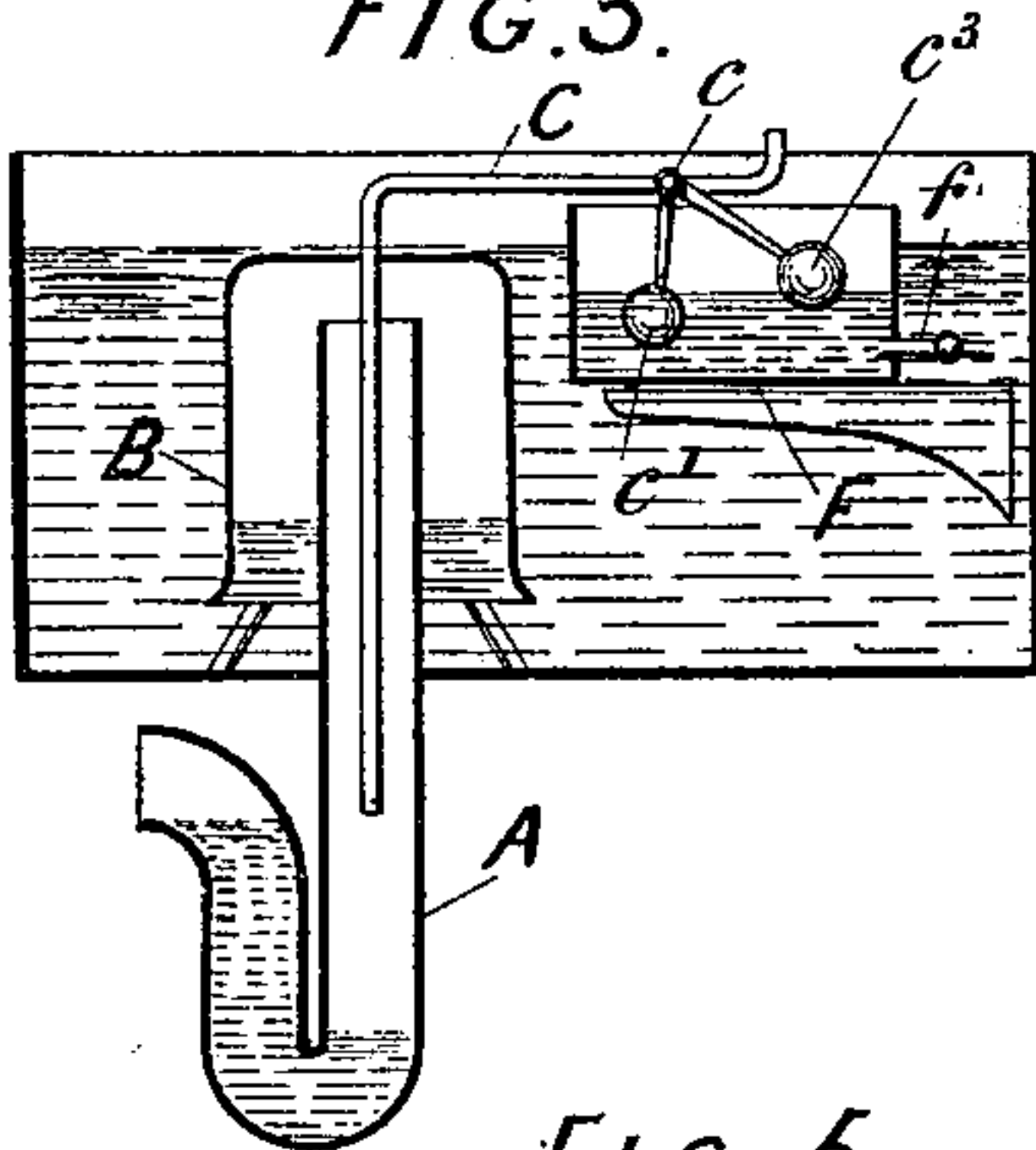


FIG. 5.

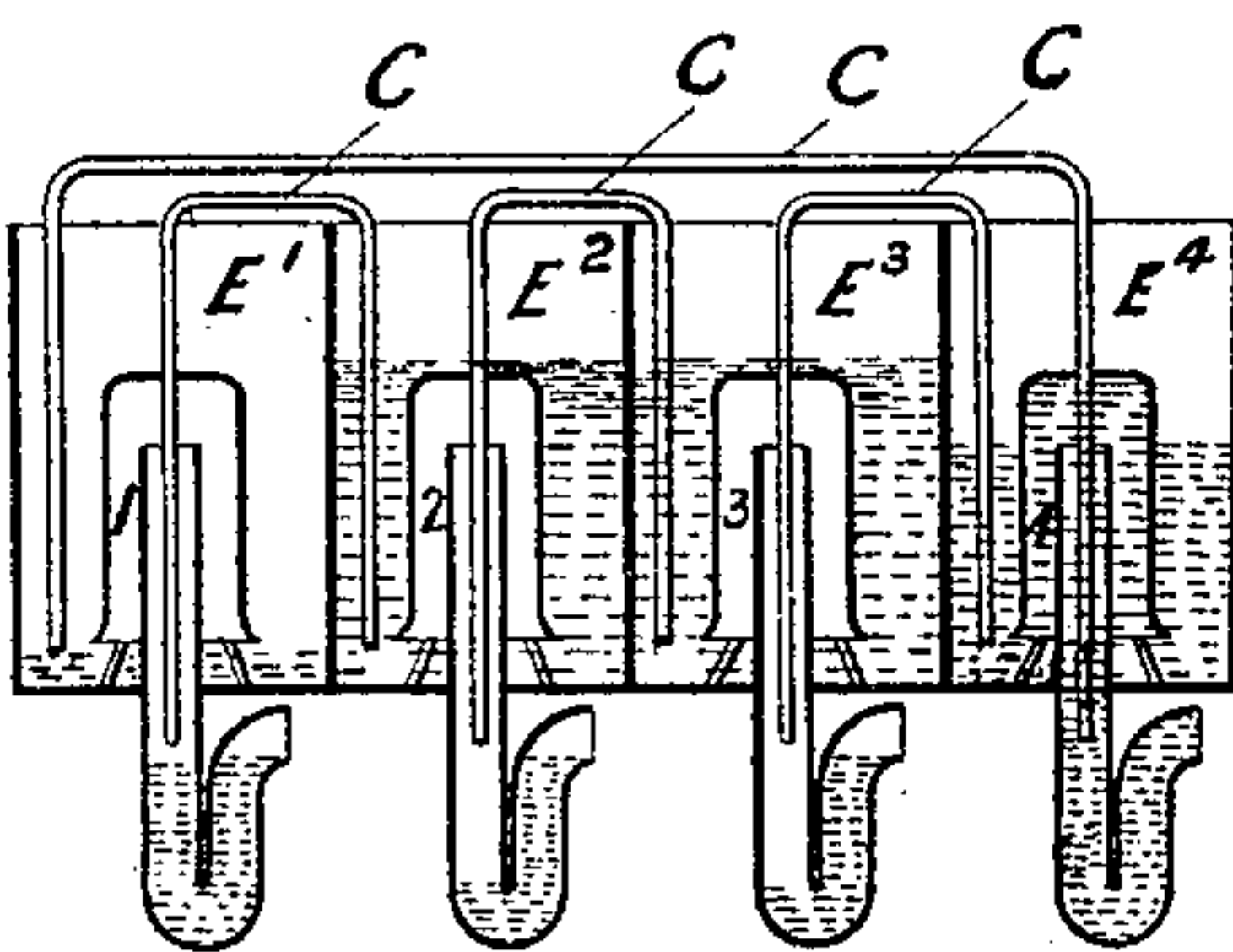


FIG. 6.

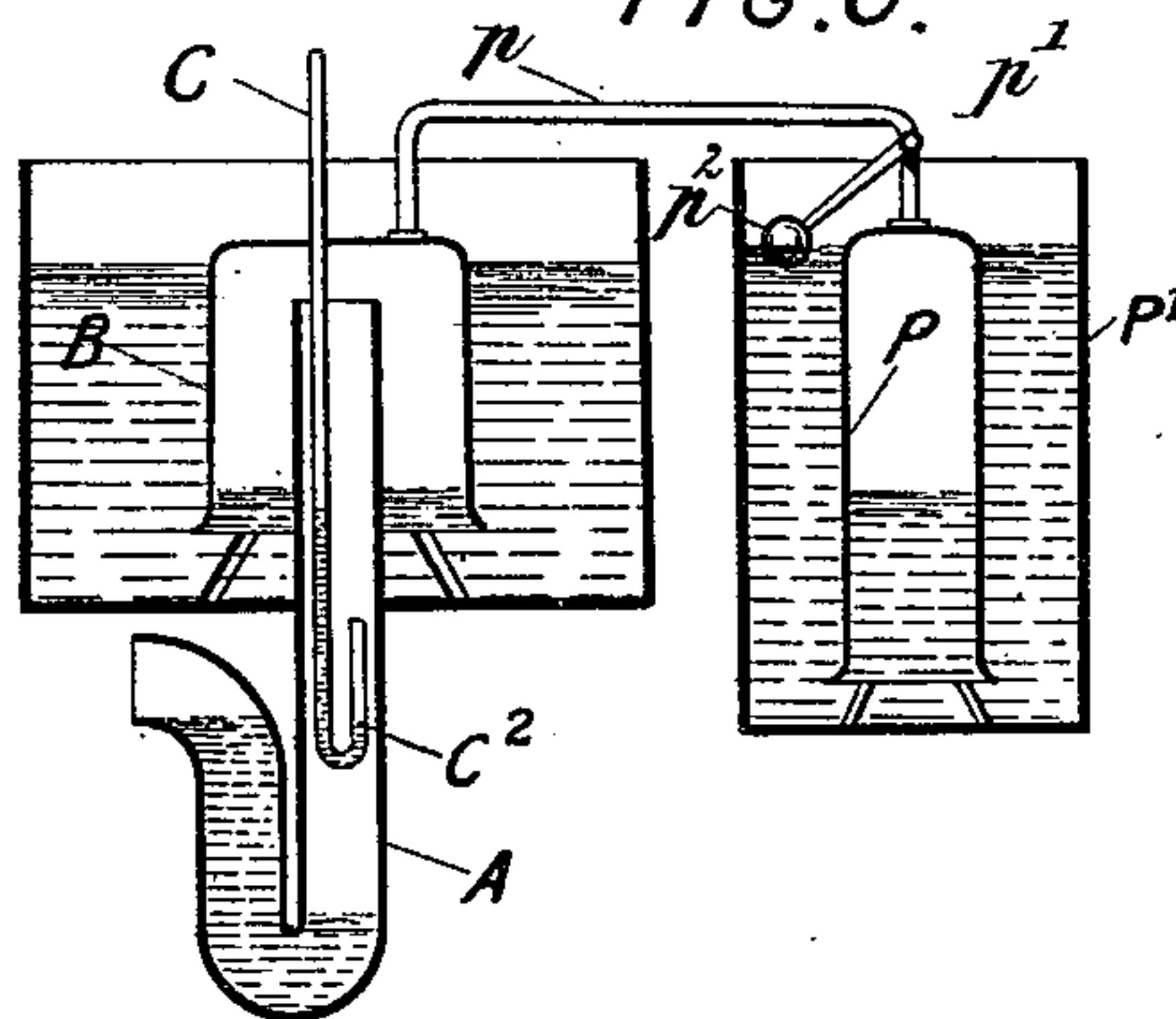
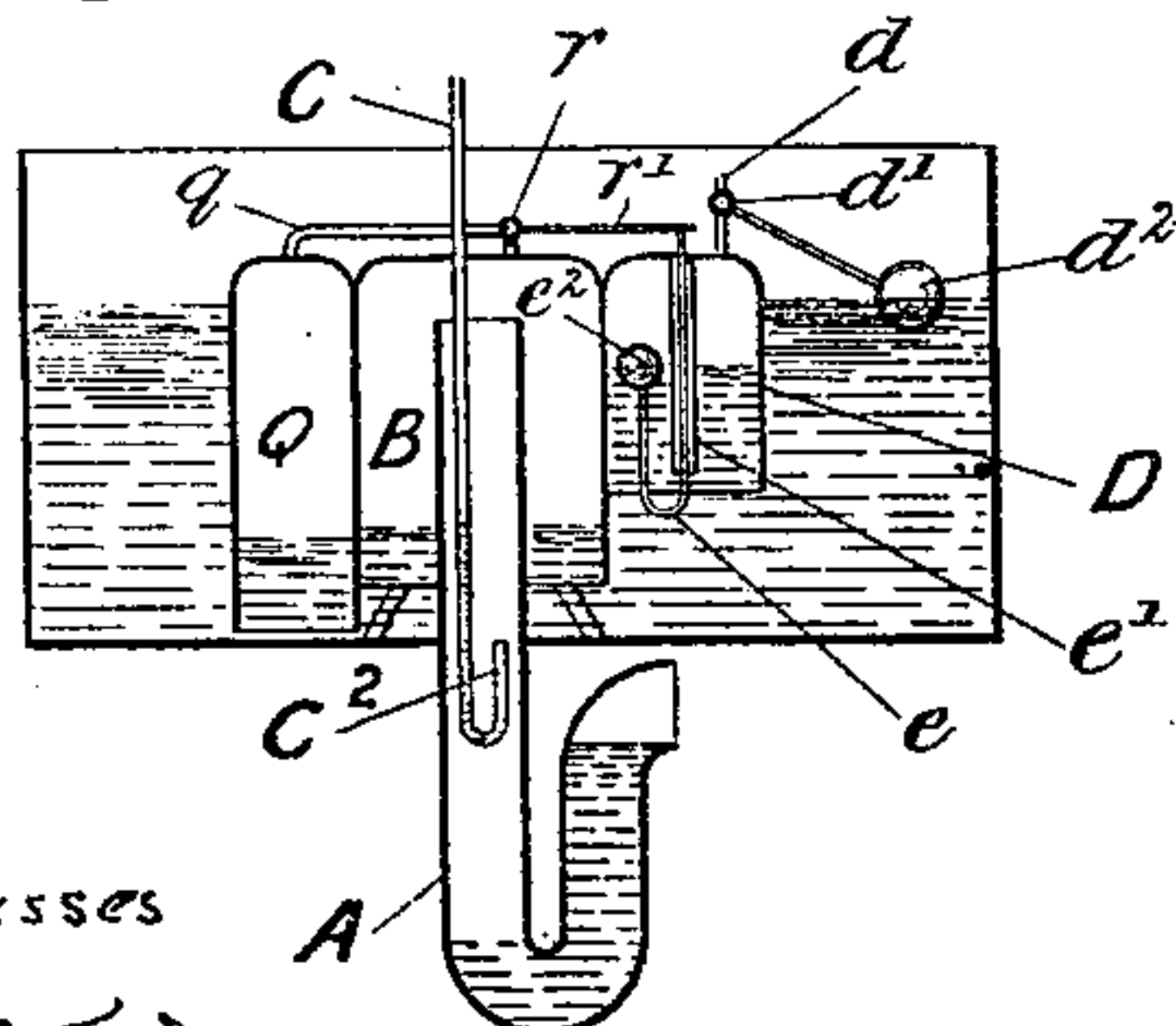


FIG. 7.



Witnesses

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UNITED STATES PATENT OFFICE.

SAMUEL HENRY ADAMS, OF HARROGATE, ENGLAND.

SIPHON.

SPECIFICATION forming part of Letters Patent No. 636,610, dated November 7, 1899.

Application filed April 24, 1899. Serial No. 714,307. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL HENRY ADAMS, a subject of the Queen of Great Britain and Ireland, residing at Cumbræ, Park avenue, Harrogate, in the county of York, England, have invented certain new and useful Improvements in or Relating to Siphons, of which the following is a specification.

This invention relates to siphons of the kind or class having a deep trap in the outgo-leg; and the said invention has for its chief object the provision of automatic means for starting siphonic action after a suitable interval, which may be regulated. For this purpose I arrange a vent-pipe in the siphon, in some cases with and in others without a liquid seal in said pipe, and I control the release of the air from the siphon, and consequently the starting of siphonic action, by the rise of liquid around the siphon or in a separate vessel, or by the discharge of the liquid contents of another vessel into which the vent-pipe dips, or by increasing the pressure of the air at the proper time, so as to force the liquid seal in the vent-pipe when such a seal is used.

My invention is especially useful in siphons for charging and discharging filter-beds, as they permit of a filter-bed remaining fully charged for a length of time, at the expiration of which it is automatically discharged.

In the accompanying drawings I have illustrated in vertical central section various modifications showing how my invention may be carried into effect.

Like letters of reference denote corresponding parts in the several figures.

Referring to Figure 1, A is the inner vertical leg of the siphon, having a deep bend near the outgo end forming a trap or seal. B is the outer part or dome of the siphon, and C is a vent-pipe for releasing at the proper time the air, which after each discharge becomes locked in the siphon in the space between the seal in the outgo-leg and the liquid surrounding the siphon. The vent-pipe extends in the inner leg down to about the level of the outgo, so as not to interfere with the siphonic action when started. Surrounding the dome B is another dome or bell D, closed at the top and open at the bottom. d is a vent-pipe for

liberating the air from this bell, and d' is a tap in said pipe controlled by a float d^2 , connected to the arm of said tap. c is a tap in the vent-pipe C, and c' is a float connected to the arm of said tap for controlling it. The arm of the float c' hangs vertically downward or is inclined backward slightly, so that the float will not open the tap; but it is furnished with a trigger or secondary arm c^2 , adapted to be actuated by a rod e , which extends through a guide-tube e' within the bell D and is furnished with a float e^2 at its inner end. The tube e' extends downward nearly to the mouth of the bell D to prevent escape of air from said bell, and the rod e is curved upward at its lower end, as shown, to bring the float well within the bell. The action is as follows: As the level of liquid around the siphon rises it first seals the mouth of the bell D and then continues to rise until it reaches and raises the float d^2 , thus opening the tap d' and allowing the air locked in the bell to escape gradually therefrom and the liquid to rise in the bell. The float e^2 is thereby raised and operates through the rod e to push the trigger c^2 and so move the float past its dead-center, whereupon the buoyancy of the float operates to open the tap c , thus releasing the locked air from the interior of the siphon and causing siphonic action immediately to commence. After the discharge the several floats fall to their initial positions. The rate at which air can escape from the tap d' determines the length of time the siphonic action is delayed. In addition to the tap d' I sometimes provide another tap d^3 to control the escape of air from the bell D. This tap may be initially set to give any desired opening.

The bell D need not surround the dome of the siphon. It may be separate, as shown in Fig. 2, and the vent-pipe C may pass out from the side of the leg A, also as shown in Fig. 2. The action of this arrangement is precisely the same as that of Fig. 1.

In the modification illustrated in Fig. 3 the release of the locked air in the siphon is controlled by the rate of admission of liquid to a tank F, in which the float of the tap c hangs. When the liquid around the siphon rises to the level of the tank F, it begins to enter said tank through a tap f , the extent of open-

ing of which is initially set to suit the requirements. I have shown the float c' hanging vertically down or set back a little, so that it cannot by its own buoyancy open the tap, a
 5 second float c^3 being provided to start the tap and bring the float c' past the dead-center.

In the modification shown in Fig. 4, which represents an ordinary bent-tube siphon having a deep bend forming a seal in the outgo-
 10 leg, the vent-pipe C, which may pass out through the crown, as shown, or through the side of the siphon, as shown in Fig. 2, instead of having a tap in it is made to dip into a vessel E, containing liquid which seals the
 15 pipe and prevents the escape of air so long as the seal remains intact. When the contents of the vessel E, in which the vent-pipe dips, are discharged, so as to unseal the pipe, the locked air escapes from the siphon, and
 20 siphonic action then commences. I prefer to provide the vent-pipe with an enlargement C' at the end to insure the locking of a sufficiency of air in the siphon when the liquid rises again in the sealing-tank and closes the
 25 end of the vent-pipe. This arrangement may be advantageously employed with a series of filter tanks or beds, for example, which require to be discharged successively. In Fig.
 30 5 I have shown four such tanks $E^1 E^2 E^3 E^4$, with a discharging-siphon in each. The vent-pipe C from No. 1 siphon enters the tank E^2 , that from No. 2 siphon enters the tank E^3 , that from No. 3 siphon enters the tank E^4 , and that from No. 4 siphon enters the tank
 35 E^1 . With such an arrangement the discharge of the tank E^1 will operate to start No. 4 siphon, and the discharge of the tank E^4 will start No. 3 siphon, and so on successively. It is obvious, of course, that a similar arrange-
 40 ment of siphons for filling the tanks successively may be employed, the starting of each siphon being governed by the discharge of one of the other tanks.

Fig. 6 illustrates a further modification, in
 45 which the vent-pipe C is open at the top and has a bend at its lower end to form a liquid seal for closing the vent. This seal is forced by means of additional air added under pres-
 50 sure. For this purpose a bell P, suspended in a separate tank P' , communicates with the dome B of the siphon by a pipe p , in which is a cock p' , controlled by a float p^2 . When liquid rises around the bell P, it compresses the air therein; but this pressure is not com-
 55 municated to the dome B until the liquid rises high enough in the tank P' to raise the float p^2 and open the cock p' , whereupon the compressed air passes into the siphon and forces the seal in the vent-pipe C, thus re-
 60 leasing the locked air in the siphon and starting siphonic action. In some instances the cock p' is dispensed with, and in such cases the pressure in the dome due to the rise of level in the tank P' increases gradually until
 65 the seal in the vent-pipe is forced. The head of liquid in the tank P' must be higher than in the tank in which the siphon is situated

and must be sufficient to force the seal in the vent-pipe, as above described.

In Fig. 7 I have shown a modification form- 70
 ing, as it were, a combination of the arrange-
 ments shown in Figs. 1 and 6. The chamber D, carrying the tube e' , with its rod e and float
 e^2 , is attached to the dome B of the siphon; but it might be separate, as indicated in Fig. 75
 2. Q is a chamber open at the bottom and corresponding to the vessel P in Fig. 6. It is set deeper in the tank than the dome B and communicates with the said dome by a pipe
 q , in which is a tap r for closing and open- 80
 ing the passage. The rod e is connected to the arm r' of the tap r and controls the tap. When the float d^2 is raised by the liquid in
 the tank and the tap d' thereby opened to re- 85
 lease the air in the vessel D, the liquid then rises in the vessel D and raises the float e^2 ,
 thus opening the tap r and allowing the more highly-compressed air in the vessel Q to en-
 90 ter the dome of the siphon and so force or blow through the seal in the vent-pipe C, thereby starting siphonic action.

What I claim is—

1. The combination with a tank or recep-
 95 tacle, of a siphon having a trap in the outgo-
 leg, a vent-pipe passing from the interior of
 the siphon into the outer atmosphere, means
 for closing said pipe, automatically-acting
 means for opening the passage through the
 pipe, and means for delaying the opening of
 said passage for any desired length of time 100
 after the head of liquid would otherwise be
 sufficient to discharge the siphon, substan-
 tially as described, and for the purpose speci-
 fied.

2. The combination with a tank or recep- 105
 tacle, of a siphon having a trap in the outgo-
 leg, a vent-pipe passing from the interior of
 the siphon into the outer atmosphere, means
 controlled by the rise and fall of the liquid
 for opening and closing said pipe, and means 110
 for delaying the opening for any desired
 length of time after the head of liquid would
 otherwise be sufficient to discharge the si-
 phon, substantially as described, and for the
 purpose specified. 115

3. The combination with a tank or recep-
 tacle, of a siphon having a trap in the outgo-
 leg, a vent-pipe passing from the interior of
 the siphon into the outer atmosphere, a cock
 for closing the said pipe, means controlled by 120
 the rise of liquid in a separate vessel for
 opening the cock, and means for delaying the
 opening for any desired length of time after
 the tank is full, substantially as described,
 and for the purpose specified. 125

4. The combination with a tank or recep-
 tacle, of a siphon having a trap in the outgo-
 leg, a vent-pipe passing from the interior of
 the siphon into the outer atmosphere, a cock
 for closing said pipe, a float for controlling 130
 said cock, means controlled by the rise of liq-
 uid in a separate vessel for moving said float
 into a position where its buoyancy can oper-
 ate to open the cock, and means for delaying

the opening of the cock for any desired length of time after the tank is full, substantially as described, and for the purpose specified.

5 5. The combination, with a siphon having a trap in the outgo-leg, of a vent-pipe passing from the interior of the siphon into the outer atmosphere, a cock for closing said pipe, a float for controlling said cock, a bell containing a float for governing the aforesaid
10 float so as to move it into a position where its buoyancy can act to open the cock, and a ball-tap for controlling the egress of air from the bell and the consequent admission of liquid thereinto, substantially as described.

15 6. The combination, with a siphon A, B having a trap in the outgo-leg, of a vent-pipe

C passing from the interior thereof into the outer atmosphere, a tap *c* in said pipe controlled by a float *c'*, an arm *c''*, a bell D inclosing a float *e''* connected to a rod *e* for actuating the arm *c''*, a tube *e'* inclosing and guiding the said rod, and a tap *d'* controlled by a float *d''* for allowing the egress of air from the bell D, all substantially as described, and for the purposes specified. 20 25

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

SAMUEL HENRY ADAMS.

Witnesses:

CHARLES DOWNEY,

GEORGE WILLIAM CURRY.