

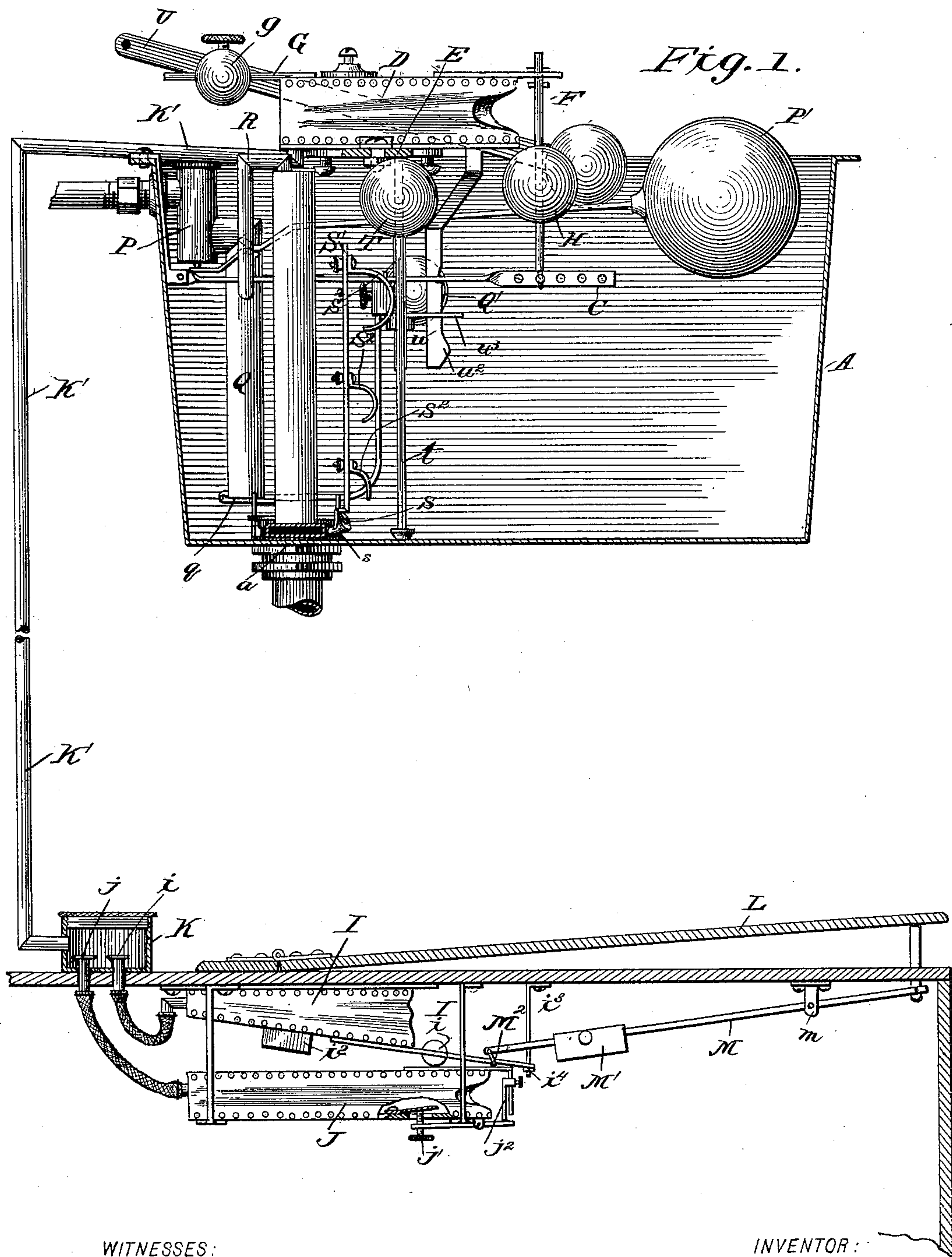
(No Model.)

4 Sheets—Sheet 1.

R. A. L. BLONDEL.
TANK.

No. 429,879.

Patented June 10, 1890.



WITNESSES:
Fred G. Dieterich
R. B. Furpin.

INVENTOR:
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ATTORNEYS

(No Model.)

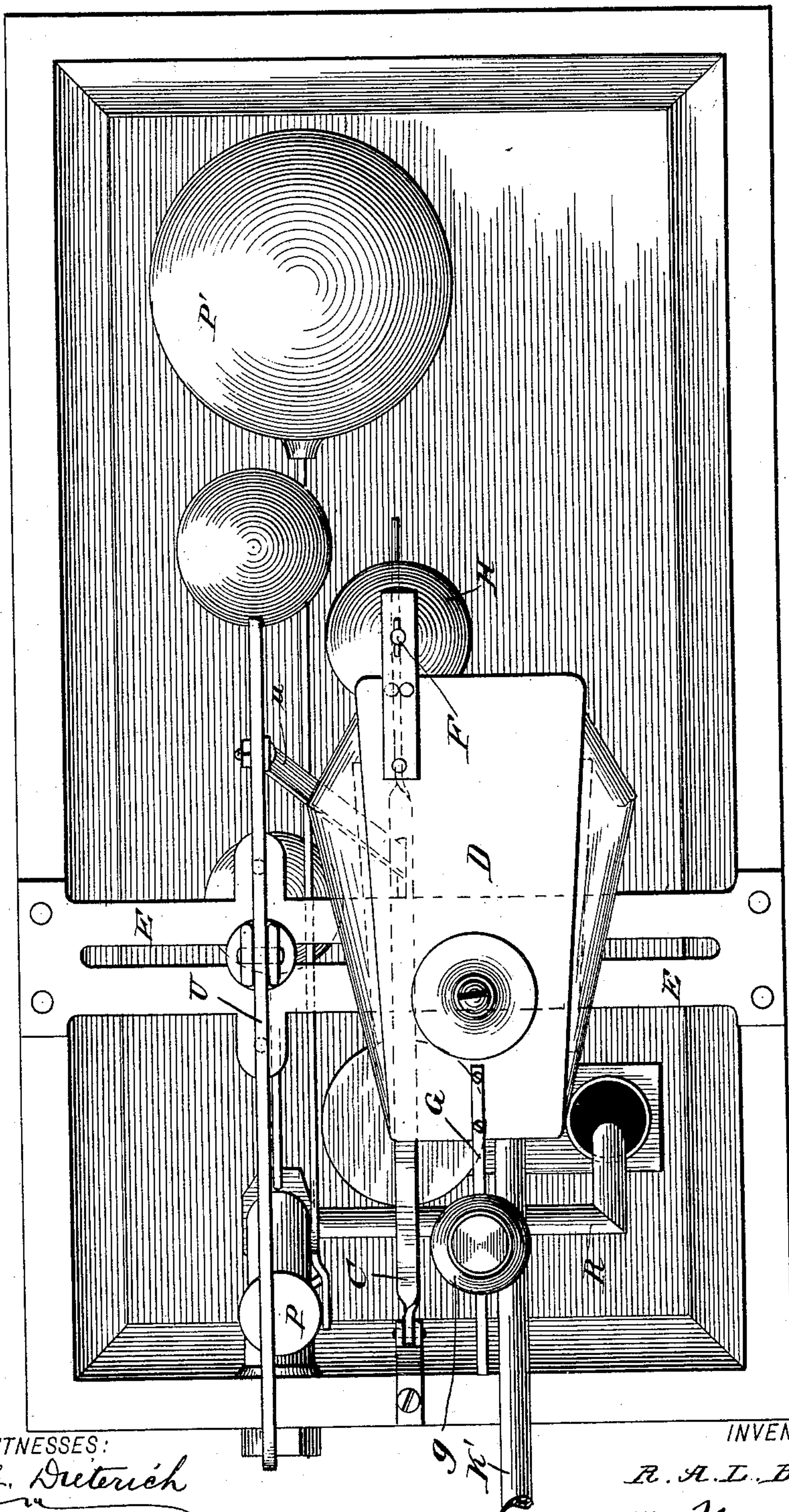
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Fig. 2.



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4 Sheets—Sheet 3.

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Fig. 6.

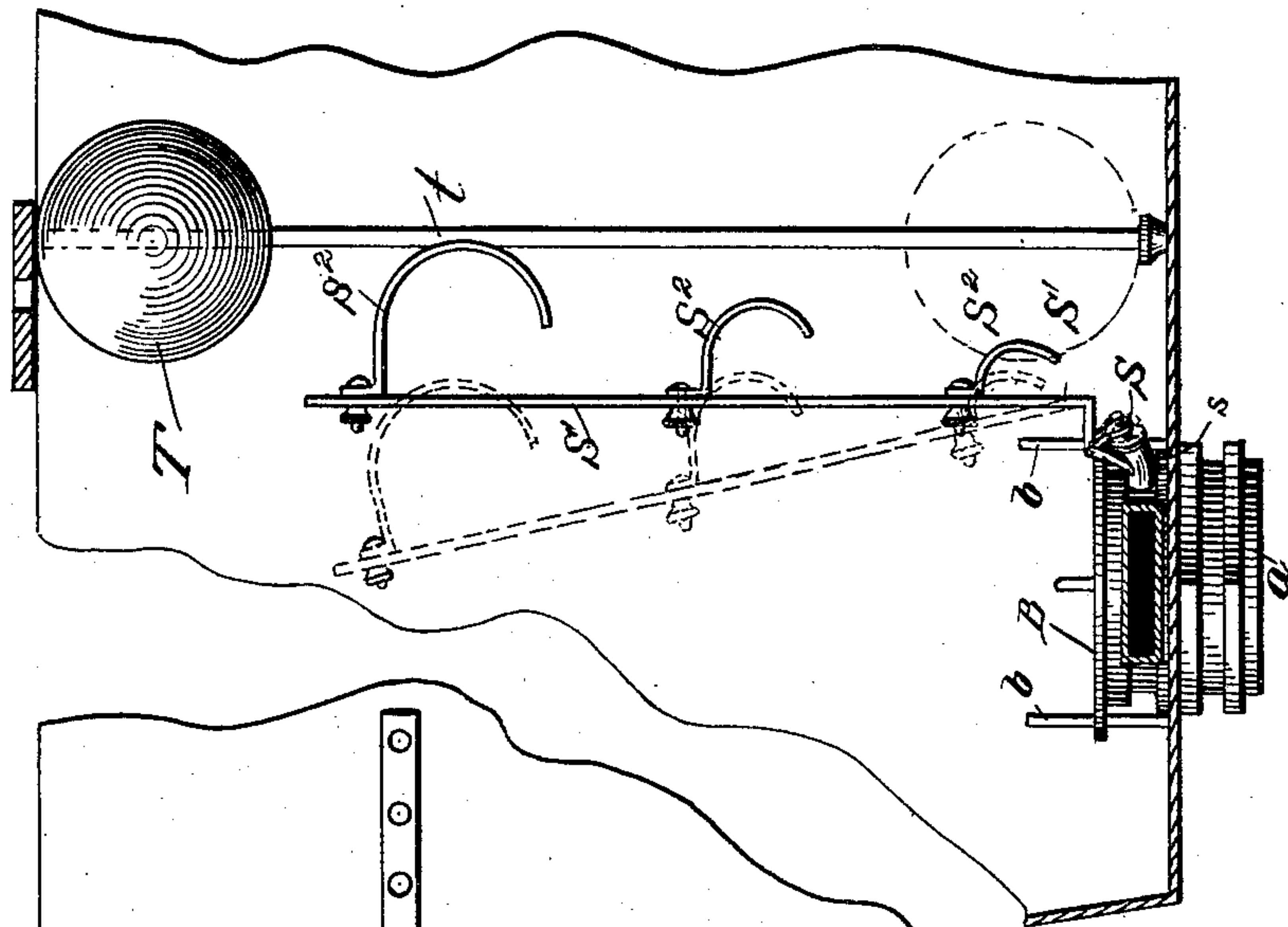
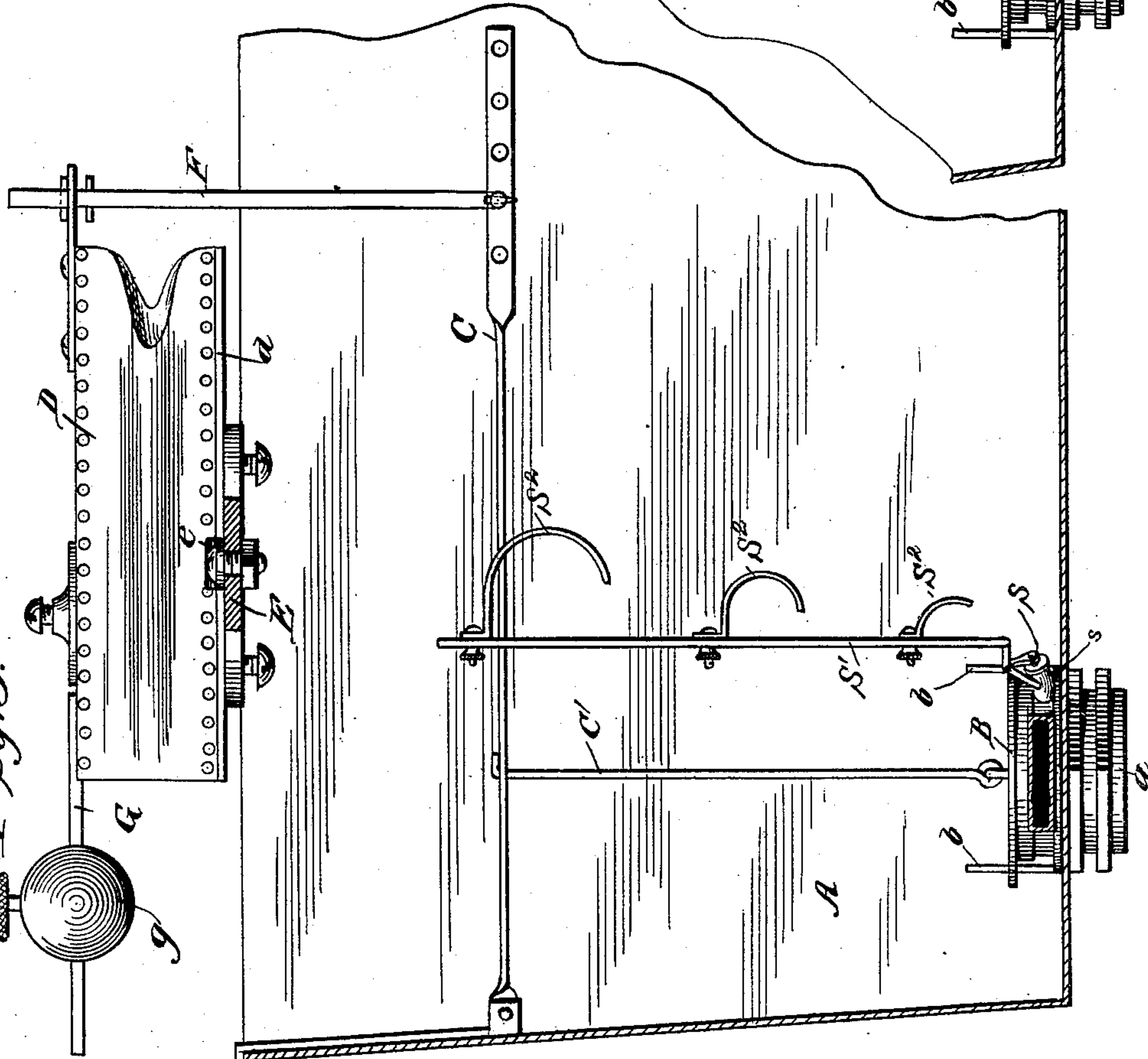


Fig. 3.



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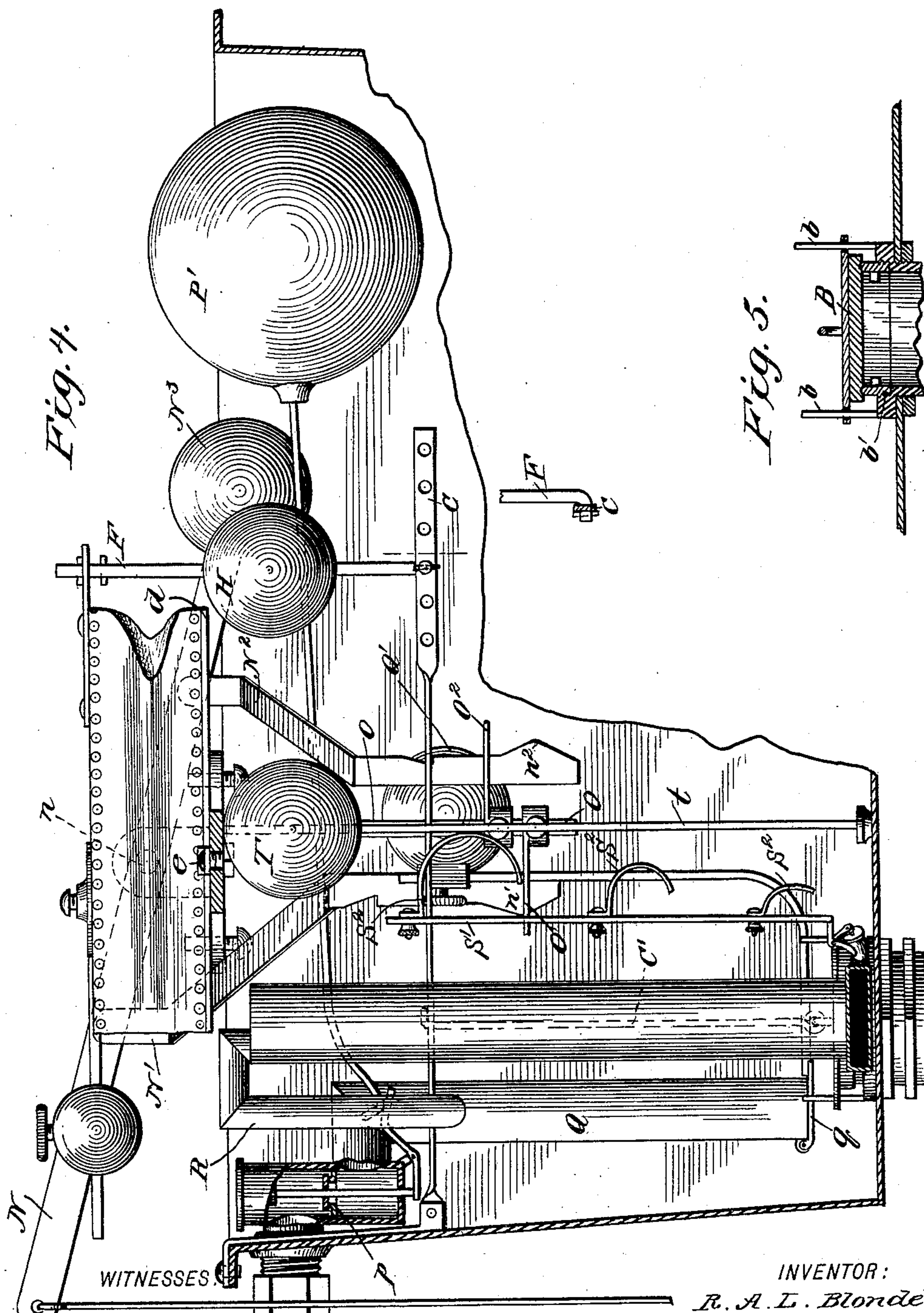
(No Model.)

4 Sheets—Sheet 4.

R. A. L. BLONDEL.
TANK.

No. 429,879.

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Fred G. Dieterich
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UNITED STATES PATENT OFFICE.

RICHARD A. L. BLONDEL, OF BALTIMORE, MARYLAND.

TANK.

SPECIFICATION forming part of Letters Patent No. 429,879, dated June 10, 1890.

Application filed February 15, 1890. Serial No. 340,533. (No model.)

To all whom it may concern:

Be it known that I, RICHARD A. L. BLONDEL, of Baltimore city, in the State of Maryland, have invented a new and useful Improvement in Tanks, of which the following is a specification.

My invention is an improvement in tanks and the discharging devices therefor, and particularly in water-closet tanks; and the present invention consists in certain features of construction whereby the discharge or flushing valve, when opened and released, will close slowly or be retarded in its closing movement, in novel constructions by which to effect the opening of such discharge-valve, and in novel after-filling constructions.

The invention consists, further, in certain details of construction and novel combinations of parts, as will be hereinafter more fully described, and pointed out in the claims.

In the drawings, Figure 1 is a vertical longitudinal section of the tank provided with my improvements, showing also the construction, arrangement, and connections of the closet-seat and bellows for filling the tank-bellows. Fig. 2 is top plan view of the tank with the improvements in place. Fig. 3 is a vertical longitudinal section, on an enlarged scale, of the tank, showing simply the tank, its outlet-valve, the tank-bellows and its support and attachments, and the connections between said bellows and valve. Fig. 4 is a sectional view showing the lever construction for operating the discharge-valve and tank-bellows. Fig. 5 shows the construction of the discharge-valve seat, and Fig. 6 shows the after-filling mechanism comprising the valve and its operating-float.

The tank A is provided with the discharge-opening *a*, controlled by the valve B, which may preferably be guided in its vertical movements by guide-pins *b*. The valve-seat *b'* may by preference be threaded into place, so it can be conveniently removed when desired. Within the tank I pivot the lever C, which is connected by rod C', or other suitable connections, with the valve B, so that the proper movements of lever C may open the said valve and permit it to close, as will be more fully described.

A bellows D is supported on a cross-bar E,

extended across the top of the tank, or is otherwise suitably supported above the tank. This bellows, except in the particulars hereinafter specified, may be of ordinary construction, and preferably has its sides formed of india-rubber or gum. At its expanding end this bellows is connected by a rod F with the lever C, so that the bellows will be expanded or filled when the lever is operated to open the discharge-valve. This bellows operates to retard the closing of the valve B and to cause the same to close slowly, to which end the lever and rods intermediate said bellows and valve form, broadly, connections between said parts, and it is obvious that it would involve no departure from this broad feature of my invention to connect the bellows and valve B by a single intermediate rod or other suitable connection, so that the closing of the valve will be retarded by the slow emptying of the bellows. It is preferred, however, to employ the lever C and other intermediate connections, as shown. An arm G extends from the bellows and supports a weight *g*, which is adjustable along arm G, so that it can operate with greater or less force on the bellows. This weight operates as a counter-balance and causes the bellows to empty slower than it otherwise would. As the bellows is filled or expanded, it opens the valve and then permits the valve to slowly close as the bellows empties. It will be seen that if the bellows be arranged to connect with the lever C near its pivot it will when expanded raise such lever and its connected valve higher than if the bellows were connected near the moving end of the lever, in the former case opening the valve to a greater degree than in the latter and permitting the valve to close in the same time in each instance, permitting in the former instance a greater flow than in the latter because of the greater extent to which the valve is opened.

To regulate the extent to which the valve may be opened, I support the bellows so that it may be adjusted. To this end I provide the bellows D with edge flanges *d* at its base, and the clamps *e* are bolted or otherwise secured to the cross-bar E and bind upon the flanges *d*, so as to secure the bellows in any suitable adjustment. It will be noticed that the rod

F is connected with the lever adjustably, the lever being provided with a series of holes to facilitate such end.

In connection with the valve and the bellows to retard the closing thereof, I provide a float H, which by its weight hastens the closing of the valve after the water has fallen in the tank below a certain point. It will be understood that when the tank is full the weight of water on the valve is sufficient to have a tendency to cause same to close, and as the water falls in the tank and the weight on the valve consequently decreases I arrange the float to exert its weight to hasten the closing of the valve.

In the construction shown the float H is supported to slide vertically on the rod F, so that on its upward movement it will rise freely, while on its downward movement, when the water in the tank passes a certain level, the float will exert its weight on the lever C, and so hasten the closing of the valve. It is manifest that this ball should be of such size and weight as to properly operate in the desired manner.

In operation the lifting of the valve will effect the expansion or filling of the bellows, as will be more fully described, and the reverse is also true—that is to say, the filling or expansion of the bellows will lift the valve, so that either of said operations may be carried out to open the valve. It is preferred, however, to lift the valve by expanding the tank-bellows. This may be effected by operating devices—such as a cord—connected with the bellows and so disposed that when drawn upon it will expand the bellows; but it is preferred to use a filling-bellows or pair of bellows, as shown in Fig. 1, by which to fill such tank-bellows at will.

In the construction shown in Fig. 1 I use two filling-bellows I and J, a confluent chamber K, into which both such bellows I and J empty, check-valves i j , to prevent the air from one bellows I or J passing back into the other, and a pipe or tube K' connecting such confluent chamber with the tank-bellows. These bellows I J are alternately emptied, and it is obvious that as each empties into the tank-bellows it will inflate the latter, lift the discharge-valve of the tank, and then permit such valve to close slowly. The top of the confluent chamber K is preferably threaded into place, so that it can be conveniently removed to permit access to the check-valves for any desired purpose.

While the bellows I J may be emptied in any desired manner, as by the opening and closing of the closet-door or the like, it is preferred to operate them from the seat of the closet, such seat L being movable, so that it will be depressed when a person sits upon it, and the bellows I J are arranged below such seat and one above the other. A lever M is pivoted at m , arranged to be tilted or rocked as the seat is depressed, and is connected and arranged with relation to bellows

I and J so that it empties one of such bellows and expands the other in both its directions of movement, the upper bellows I being emptied as the closet-seat is depressed and the lower bellows J being emptied as the closet-seat rises, the lever M being weighted at M', so that it will properly empty the bellows J. The lever is connected with bellows J by a suitable link or hinge M'. A wheel i' reduces the friction between the bellows I J when the bellows J forces bellows I up, and a weight i^2 aids in lowering such bellows in the filling thereof.

To avoid the forcing of too much air into the tank-bellows, I provide each of the filling-bellows with means to limit the air forced thereby. To this end I provide the upper bellows with a rod i^3 and nut i^4 , threaded thereon, by which to limit the extent to which such bellows can be expanded, and consequently the amount of air it will force out when emptied. The lower bellows J has a trip-screw or projection j' , which engages its inlet-valve, such projection j' being supported on a lever pivoted to one side of the bellows, and a rod or trip j^2 being adjustably supported on the opposite side of the bellows and being arranged so that the projection j' can open the inlet-valve at any predetermined time, and so quickly empty the bellows J. Manifestly the lever N forms a simple convenient means for operating the bellows I J, and is much preferred. Still it would involve no departure from the broad principles of this feature of my invention to use other intermediate devices between the closet-seat and the filling-bellows I and J. By the use of both bellows I and J, I get both a before and an after wash, but where but a single wash is desired but one of such bellows need be used—the bellows I for the beforewash, or the bellows J for the afterwash. It will also be understood that the bellows I J may be made of different size to provide a large afterwash and a small beforewash, or to otherwise vary the washes as may be desired.

While, as before stated, the valve may be opened by expanding or filling the tank-bellows, it may be preferred in some instances to use other devices for opening the valve. In Fig. 4 I show such construction consisting of a lever N, pivoted at n , and having catch-bars N' N² on opposite sides of its pivot, which, as the lever is rocked on its pivot, alternately engage suitable bearings on the lever C, and lift such lever C and the valve therewith connected. This lever N is actuated in one direction by the aid of a pull-chain or other suitable operating device and in its opposite direction by a weight N³.

On the catch-bars N' N², I provide cams n' n^2 , which by engaging suitable bearings or projections O' O² on a fixed support O operate to release the catch-bar from the lever C, when the said lever has been lifted to a suitable height. Manifestly one of the catch-bars N' N² may be omitted, if only a before or an

after wash is desired, and it is also manifest that the weight N^3 may be put on the opposite end of lever N , and such end be pushed up instead of drawn down in the use of the tank. It will also be understood that in shallow tanks the rod C' may be omitted and the lever C be connected directly with the valve; but in deep tanks the construction as shown is preferred.

The inlet devices comprise the inlet-chamber P , arranged near the top of the tank and having the valve p , the outlet-pipe Q , controlled by valve q , operated by float Q' , and the branch pipe R , extending up and arching over and emptying in the overflow-pipe S , the float Q' being arranged to close its valve q shortly before the float P' closes the valve p , so that a portion of the last water emptied into the tank may be discharged over into the overflow-pipe and serve as an afterfill to fill the trap of the closet. Such devices p , q , Q , Q' , and R are not claimed specifically herein, as they are included in the subject-matter of an application for Patent, Serial No. 331,577, filed by me November 25, 1889. Such construction, however, provides a convenient afterfill for making the afterfill when the supply is on. Now to effect the after-filling when the supply is shut off and to cause the very last portion of the water which may flow from the tank to effect the after-filling of the trap, I provide the construction shown most clearly in Fig. 6, in which an outlet s is arranged below the outlet of the discharge-valve and is controlled by a valve S , from which extends an arm S' , formed or provided with cam-like portion or portions S^2 , which are arranged to be engaged by a float T , such float being shown as guided on a rod t , and being arranged to engage the cam-like portions S^2 successively as the water falls in the tank, and which, when the water is low down in the tank, will open the valve S and permit the water to empty slowly through outlet s to fill the trap of the closet or the like.

It will be seen that I provide my tank with two afterfills, one for filling the trap when the supply is on and the other to effect such filling when the supply is off, and so far as I am informed this is broadly new in sanitary service-tanks.

In order to open the valve by hand in case the filling bellows or tubes should get out of order, I provide in the tank a lever U , to which is connected a catch-bar u , which detachably engages the lever connected with and forming a part of the valve, such catch-bar being provided with a cam u^2 , and a relatively-fixed bearing or projection u^3 being provided in the tank for engagement by the said cam u^2 to trip the catch-bar out of engagement with the part it detachably engages. At its top the bellows D has a regulating-screw, which regulates the closing of the bellows and may be adjusted to let the air escape fast or slow.

Having thus described my invention, what I claim as new is—

1. The combination, with the tank, its dis-

charge-valve, and a bellows connected with said valve, of two filling-bellows, connections between said filling-bellows and the said first bellows, and operating devices by which said filling-bellows may be alternately emptied, substantially as set forth.

2. The combination, substantially as herein described, of the closet-seat movably supported, the two filling-bellows and operating-connections by which the movement of the seat may be caused to alternately empty the said filling-bellows, and the valve-operating devices and connections between the same and the filling-bellows, substantially as set forth.

3. The combination, substantially as described, of the closet-seat, the two filling-bellows supported adjacent to the said seat and to each other, and a pivoted lever arranged to be tilted by the seat as the latter is depressed, such lever being arranged to empty one bellows and expand the other when the seat is depressed, and being provided with a weight by which to empty the latter bellows when the closet-seat rises, and the valve-operating devices and connections between the same and the filling-bellows, all substantially as and for the purposes set forth.

4. The combination of the tank, its discharge-valve, a bellows connected with said valve, the two filling-bellows, a confluent chamber into which said filling-bellows empty, suitable check-valves, and a connection between said confluent chamber and the first bellows, all substantially as and for the purposes set forth.

5. The combination of the tank, its discharge-valve, and the bellows adjustably supported and connected with the discharge-valve, substantially as and for the purposes set forth.

6. The combination of the tank, its discharge-valve, a pivoted lever arranged above and connected with the valve, a bellows arranged above said lever, a rod connecting the lever and bellows, and a float supported to slide on said rod, substantially as set forth.

7. The combination, with the tank and its discharge-valve, of the bellows connected with the valve and provided at its base with edge flanges, the support for said bellows, and the clamps connected with said support and adapted to bind upon the base-flanges of the bellows, whereby the latter may be secured in its different adjustments, substantially as set forth.

8. The combination of the tank, the after-filling valve, a rod or bar connected with said valve and provided with a plurality of cam-like portions or projections, and a float arranged to successively engage such portions or projections, substantially as set forth.

9. The combination of the tank, the discharge-valve, a lever or its equivalent, a catch-bar connected with one of such parts of the lever or valve and detachably engaging the other one of such parts and provided with a cam, and a bearing arranged for engagement

by the said cam, whereby to trip the catch-bar out of engagement with the part it detachably engages, substantially as set forth.

10. The combination of the tank, its valve, 5 mechanism for opening such valve, including a lever C, a rod F, extending up therefrom, and a connection between the lever C and the valve, and a float supported to slide on the rod F, all substantially as and for the purposes set forth. 10

11. The combination of the tank, its discharge-valve, a bellows connected with the valve and adapted to retard the closing of same, and a float by which to accelerate the 15 closing of the valve, such float being arranged to accelerate the closing of the valve before the bellows ceases its retarding action, substantially as set forth.

12. The combination of the tank, the after- 20 filling valve, a rod or bar connected with such valve and having a cam-like portion or projection, and a float supported independently of said rod or bar and arranged to engage the cam-like portion or projection thereof, substantially as set forth. 25

13. The combination of the tank, its discharge-valve, a bellows connected with said

valve, the filling-bellows by which to fill said first bellows, and adjustable controlling devices by which to limit the air forced by said 30 filling-bellows, substantially as and for the purposes set forth.

14. The combination of the tank, its discharge-valve, the bellows supported above the water-level of the tank, the lever C, pivoted 35 within the tank, a connection C' between said lever and the valve, and a connection F between said lever and the bellows, all substantially as and for the purposes set forth.

15. The combination of the tank, the after- 40 filling valve, a rod or bar pivotally supported and connected with the valve and having an upwardly-projected portion provided with cam-like portions or projections, and a float arranged to rise and fall alongside of said up- 45 wardly-projected portion and to engage the cam-like parts or projections thereof, all substantially as and for the purposes set forth.

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Witnesses:

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