No. 693,293. Patented Feb. 11, 1902.

E. F. MACKUSICK.

ACETYLENE GAS GENERATOR.

(Application filed Mar. 14, 1901.)

(No Model.) 3 Sheets—Sheet 1.

FIG. 1.

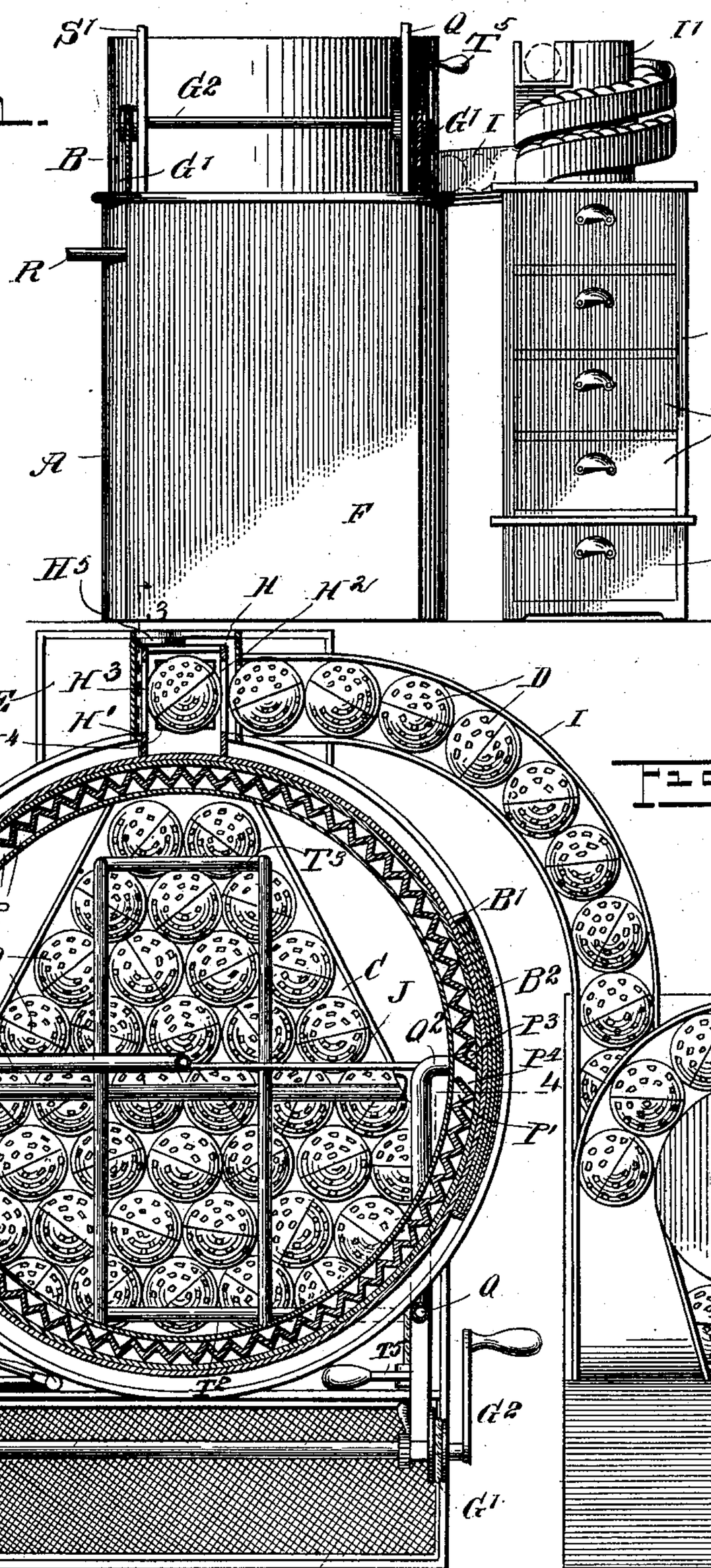

FIG. 2.

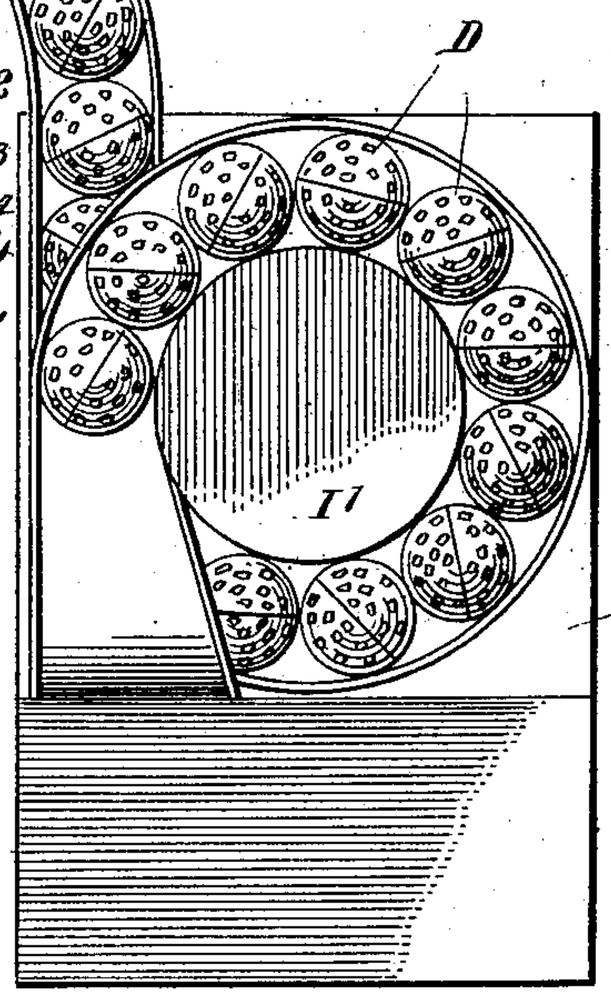

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Fig. 2

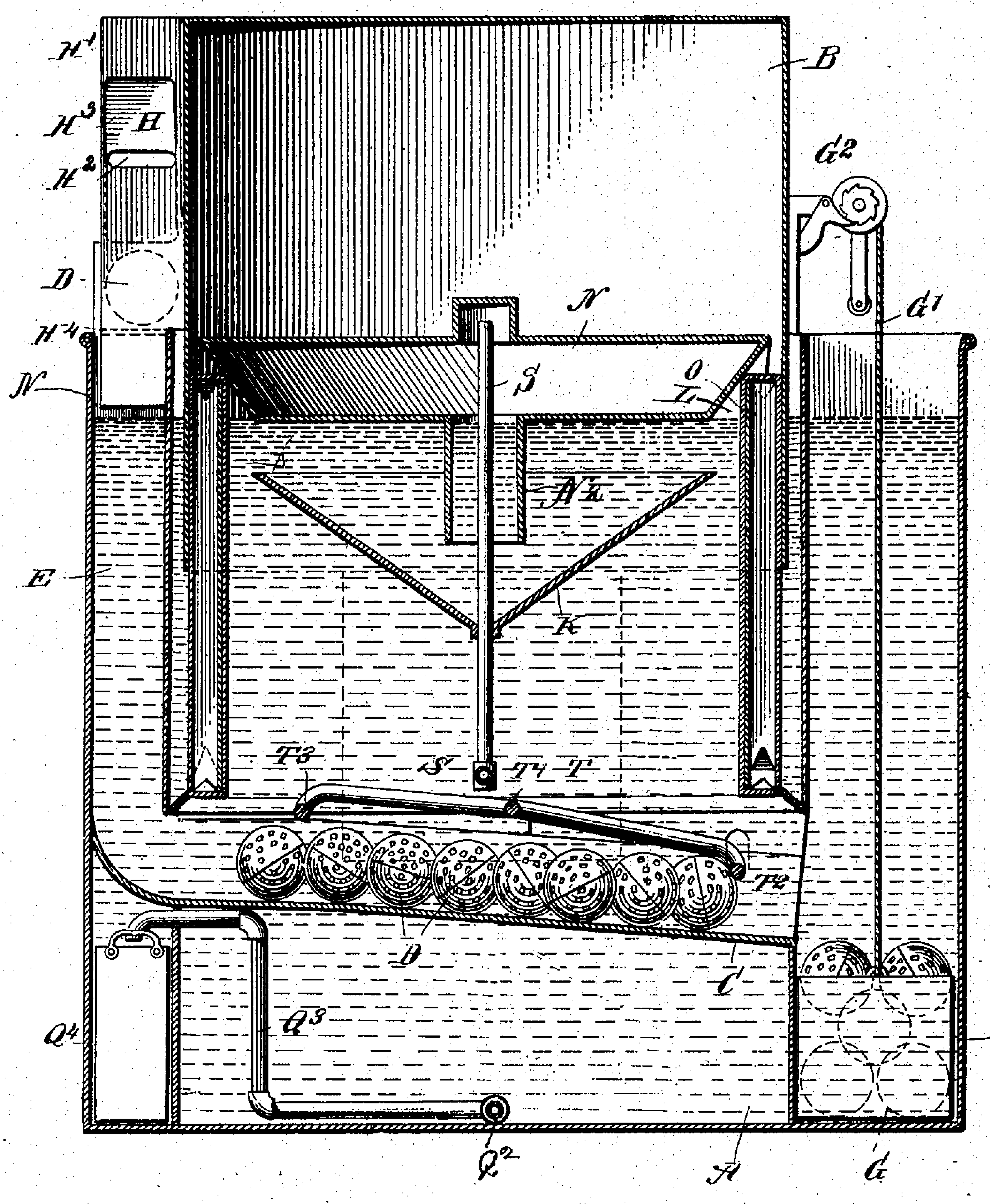

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Fig. 4.

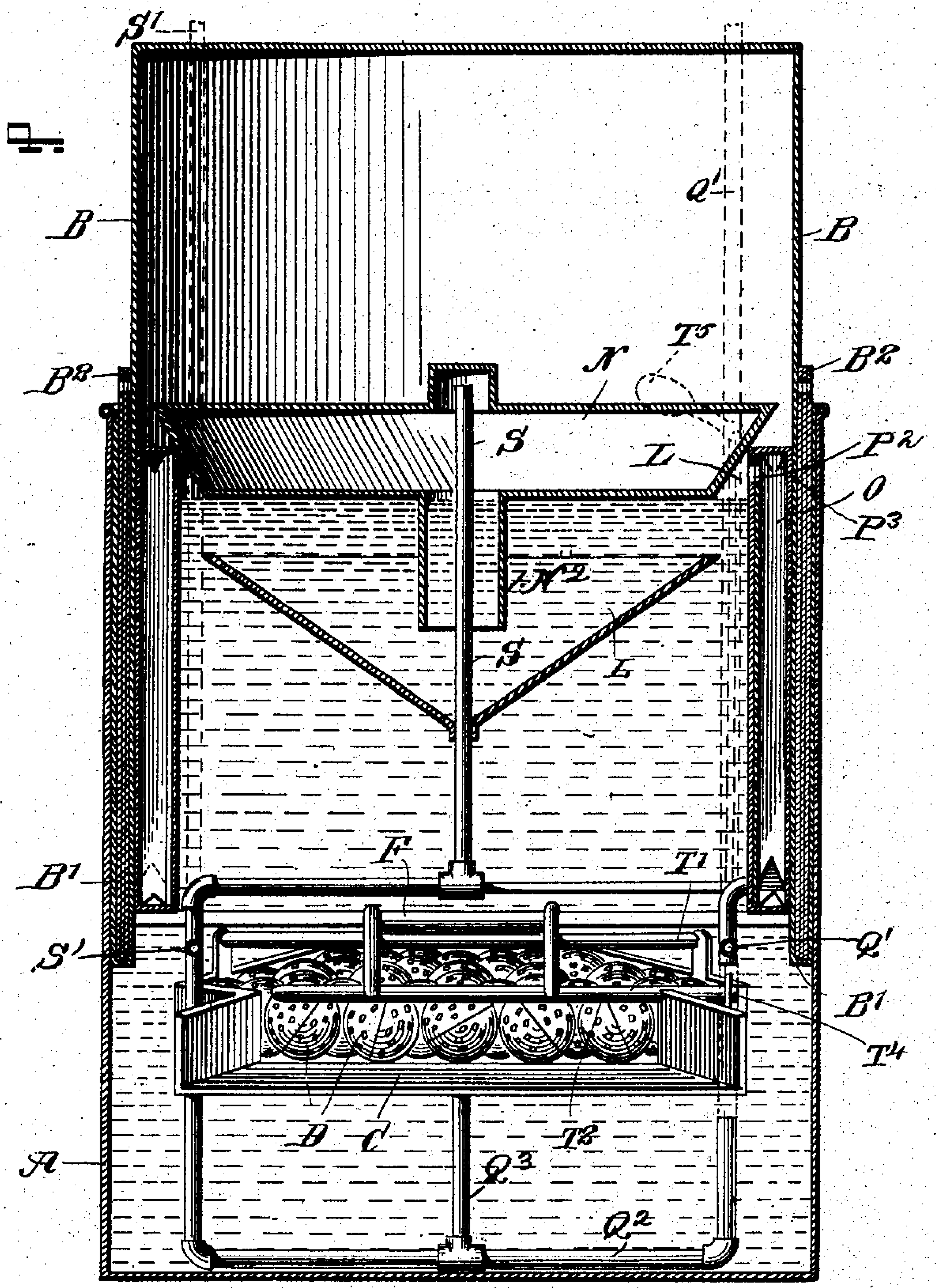


Fig. 5.

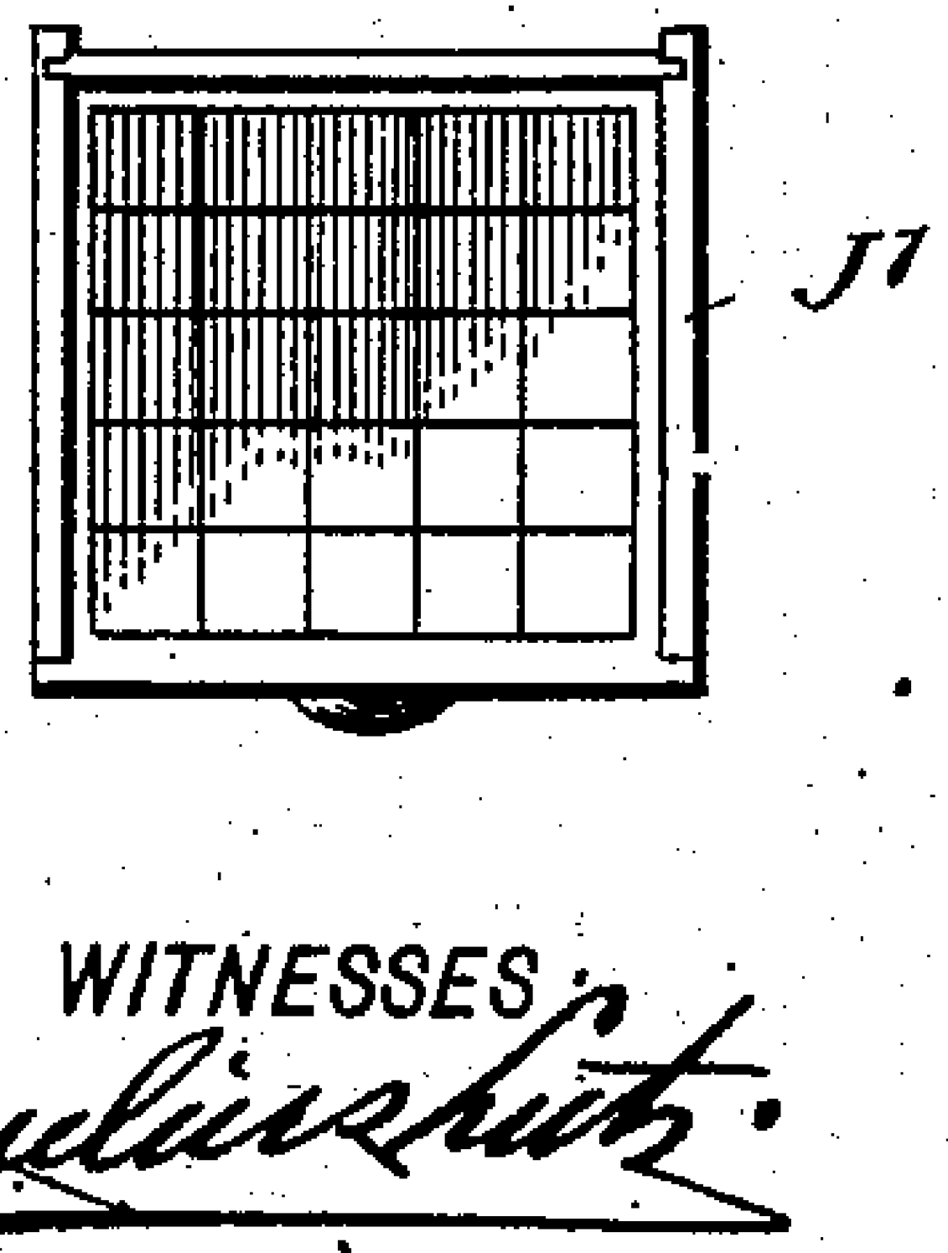


Fig. 6.

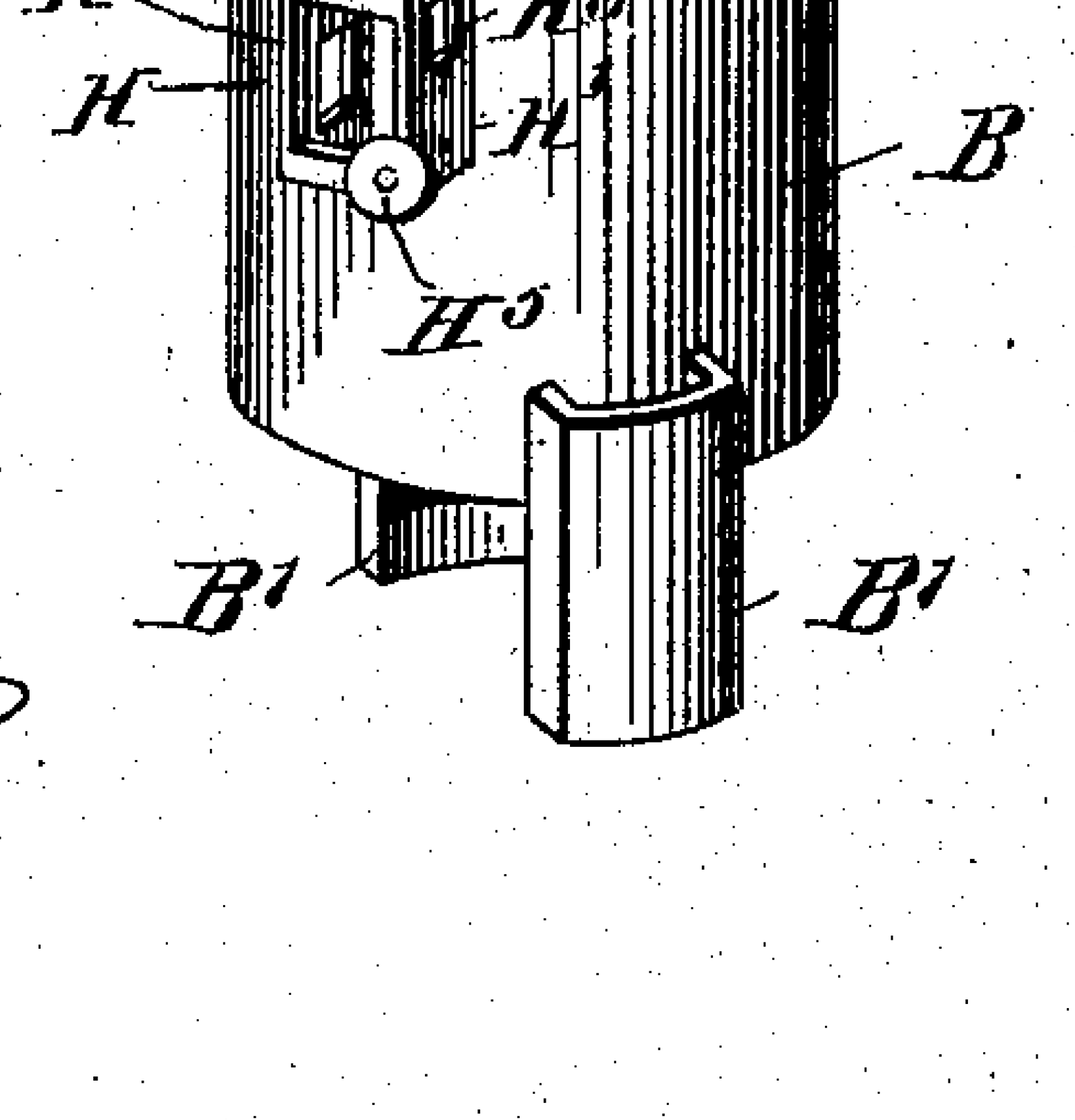
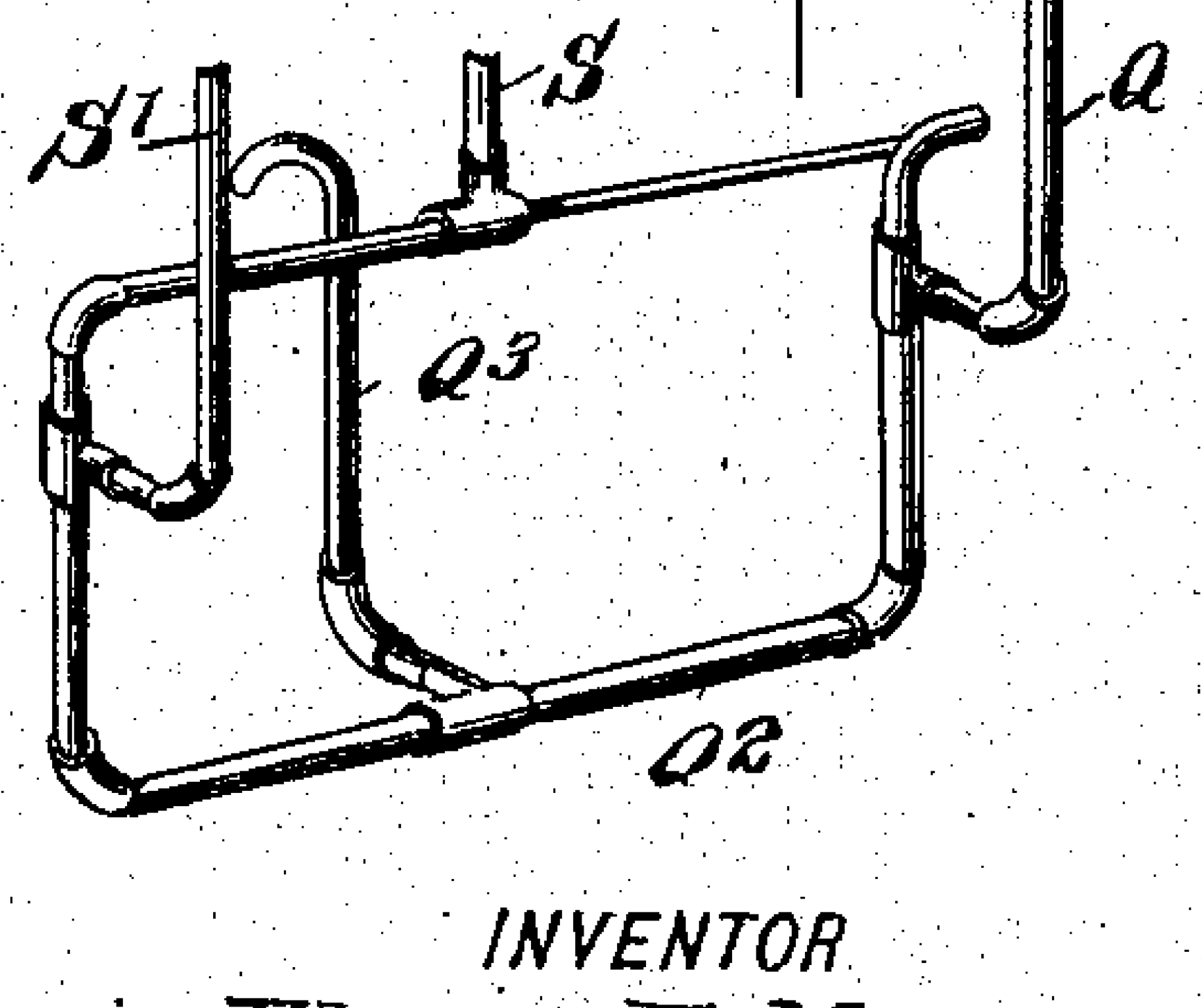


Fig. 7.



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ATTORNEYS

UNITED STATES PATENT OFFICE.

ELMER F. MACKUSICK, OF NEW YORK, N. Y., ASSIGNOR OF ONE-HALF TO GEORGE V. FOSTER, OF NEW YORK, N. Y.

ACETYLENE-GAS GENERATOR.

SPECIFICATION forming part of Letters Patent No. 693,293, dated February 11, 1902.

Application filed March 14, 1901. Serial No. 51,075. (No model.)

To all whom it may concern:

Be it known that I, ELMER F. MACKUSICK, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented a new and Improved Acetylene-Gas Generator, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved acetylene-gas generator arranged to automatically feed and charge the generator with calcium carbid or similar gas-generating substance in a very simple and effective manner and without danger of losing the gas-saturated water and at the same time permit of using the device without the aid of skilled labor, the generation of gas automatically stopping upon cessation of consumption of the generated gas.

The invention consists of novel features and parts and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the improvement as arranged for use in houses, stores, and like places. Fig. 2 is an enlarged plan view of the same with parts in section. Fig. 3 is a transverse section of the same on the line 3 3 in Fig. 2. Fig. 4 is a sectional side elevation of the same on the line 4 4 in Fig. 2. Fig. 5 is a plan view of one of the storage-drawers for the charges. Fig. 6 is a reduced perspective view of the gasometer-bell, and Fig. 7 is a perspective view of the pipe arrangement for the escape of the excessive pressure of gas and the water of condensation.

The improved gas-generator is arranged with a tank A, adapted to contain water, and in the said tank is arranged to rise and fall a gas-bell B, having on opposite sides a downwardly-extending box B′ for containing removable weights B^2 for giving the desired pressure to the gas accumulating in the bell and also for giving the necessary stability to the bell, especially as the box and weights are at the lower end of the bell and extend below the same, as will be readily understood by reference to Figs. 2, 4, and 6.

In the tank A, a suitable distance from the bottom thereof, is arranged an inclined platform or support C, adapted to support at one time a plurality of charges D, containing calcium carbid or other generating substance. Each charge D is made spherically and is more fully shown and described in the divisional application for Letters Patent of the United States, filed under even date herewith, Serial No. 51,074, so that further detail description of the charge is not deemed necessary in this application.

The charges are successively and automatically passed to the said support C through an upwardly-extending passage E, leading to the top of the tank A, at one side thereof and outside of the tank and the bell, as is plainly indicated in Fig. 3, said passage being in communication with the interior of the tank, so that it is filled to the same level with water as the tank itself. The lower end of the support C opens into a well F, likewise filled with water to the level of that in the tank and arranged on the outside thereof, and in this well is arranged a carrier in the form of a basket G, adapted to receive the spent charges from the support C, the arrangement being such that when the basket G is in a lowermost position its top edge is below the bottom of the support C, so that when the spent charges on the support are released, as hereinafter more fully described, then said spent charges travel by their own weight down the inclined support and finally drop into the basket G. When the latter is filled, it is raised, and for this purpose said basket is hung on ropes or chains G′, extending upwardly in the well F to a windlass G^2, carried by suitable brackets, said windlass being under the control of the operator. By the arrangement described the basket G, with the spent charges, can be raised to the top of the well, and then said basket is emptied and returned to its lowermost position in the bottom of the well F for receiving another load of spent charges.

The inlet to the passage E leading to the support C is controlled by a cut-off valve carried by the bell B and in the form of connected parallel plates H H′, secured to the

bell on the outside thereof, as is plainly shown in Fig. 6. The plates H H′ are provided with openings H^2 H^3, respectively, located at different levels and of which the opening H^2 is adapted to register with the lower end of an inclined channel or guideway I, having its upper portion preferably arranged in spiral form around a post I′, set in a cabinet J, having drawers J′ for containing the calcium-carbid charges and also having a bottom drawer J^2 for containing the empty spherical shells to be filled with calcium carbid.

The inclined guideway I is filled with charges D, arranged one behind the other, as indicated in Figs. 1 and 2, the lowermost charge resting against the plate H until enough gas has been consumed to sink the bell B and bring the opening H^2 in register with the discharge or outlet end of the inclined guideway I. When this takes place, the lowermost charge D drops through the opening H^2 into the space between the plates H H′ and upon a support H^4, carried by the tank A and extending between said plates H H′. When the bell B sinks still farther, then the plate H cuts off the next charge D in the guideway I, and said charge D, now temporarily supported between the plates H H′ on the support H^4, registers with the opening H^3, and the charge rolls off the platform or support H^4 and drops through said opening H^3 into the passage E and through the water therein to finally reach the platform or support. As soon as a fresh batch of gas is generated from the calcium carbid of the last charge the bell B rises and the opening H^2 finally registers with the entrance end of the guideway I, so that the now lowermost charge D passes through the opening H^2 upon the platform H^4 and automatically passes to the support C on the next descent of the bell B, as above explained. Thus the cut-off valve carried by the gas-bell B automatically feeds the charges successively to the support C, on which the charges accumulate in rows, as indicated in Fig. 2.

In order to reduce friction to a minimum, a friction-roller H^5 is journaled to the connected plates H H′ and travels on the walls of the passage E, as shown in Fig. 2, it being understood that the weight of the charges contained in the guideway I and pressing against the valve-plate H′ tends to retard the free rising and falling of the bell B. By the use of the friction-roller H^5 the bell B will readily rise and fall without danger of the plate H′ binding on the wall of the passage E.

Within the tank A and concentric therewith is arranged the annular condensing-chamber O, forming with the tank an annular space for the passage of the bell. The condensing-chamber O is formed with vertically-disposed channels P, alternately connected at top and bottom, and to the upper end of the condensing-chamber is secured the hollow cover N, having beveled sides and forming therewith an annular chamber L, communicating with one channel P′ of the condenser through the port P^2. The gas generated in the tank A passes into the chamber L, and from thence into the channel P′, and after passing through the several channels, and consequently up and down all around the condensing-chamber, passes into the bell B through the open top of the channel P^3. The gas passes from the bell through channel P^4, arranged between the channels of the condenser, but not communicating therewith, to the pipe Q, whose end Q′ leads to the burners. To allow the escape of gas in case of excessive accumulation of gas in the holder, the hollow cover N is provided with a downwardly-extending tube N^2, opening at its lower end below the top of the cone-shaped deflector K, secured to the pipe S, extending up into the hollow cover N, and terminating in an upwardly-discharging pipe S′. The pressure due to the excessive accumulation of gas in the chamber L will force the water of the tank downward, and when the lower end of the tube N^2 is uncovered the gas will pass up through the tube into the hollow cover N and from thence out through the pipes S S.

In order to maintain an approximately constant water-level in the tank A, the passage E, and the well F, a water-supply pipe R is provided, opening into the well at one corner thereof, as is plainly shown in Figs. 1 and 2, and on the inner end of this water-supply pipe R is arranged a valve R′, controlled by a float R^2, which opens the valve when the water falls and closes the valve when a sufficient quantity of water has been supplied to maintain a normal level in the tank A, the passage, and the well F.

The retaining device, previously mentioned, for retaining a number of charges D on the support C consists, essentially, of a lever T, fulcrumed at or near its middle at T′ on the side flanges of the support C, and this lever T has a forward cross-arm T^2, adapted to engage the charges D near the discharge end of the support C to hold all the charges in position on said support. The lever T is also provided with a rear cross-arm T^3, adapted to swing downward between the last two rows of charges D on the support C, so that when a swinging motion is given to the lever T to move the forward arm T^2 upward then the rear cross-arm T^3 swings downward, and consequently retains the last row of charges D on the support C, while the remaining charges D roll off the inclined support C down into the basket G. The lever T is manually actuated and for this purpose is connected by a rod T^4 with a lever T^5, arranged in the upper portion of the well F, so as to be within convenient reach of the operator.

Normally the lever T stands in the position shown in Figs. 3 and 4, so that the charges are retained on the support C; but when it is desired to discharge the spent charges, with the exception of the last row, then the operator imparts a swinging motion to the lever T by manipulating the lever T^5 to lock the rear

row of charges against movement and to release the remaining charges, so that they roll off the support C, as above described. When this has been done, the operator again imparts a swinging motion to the lever T to bring the latter back to its former position and to allow the previously-retained charges to roll forward on the inclined support C until said charges abut against the front cross-bar T^2. As the charges D drop through the passage E from the inclined guideway I, as previously explained, they accumulate on the support C in rows. Thus the charges are kept in the water until the generating material has been completely relieved of its gas.

From the pipe Q, which leads from the condenser and through which the gas passes to the burners, a drip-pipe Q^2 extends downwardly and transversely and terminates in a rising end Q^3, discharging into a pail or other receptacle Q^4, set in a recess in the tank below the passage E, as is plainly shown in Fig. 3, whereby the water of condensation in the condenser and which passes therefrom through the gas-pipe Q can be drained off into the said receptacle.

The gas-holder here shown and described forms no part of the present invention, being the subject of a separate application, Serial No. 28,291, filed August 28, 1900.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. A gas-generator, comprising a water-tank having an inclined submerged support for a carbid charge, a vertical passage at one side of the tank and leading into the same above the said support, said passage being filled with water from the tank, a gas-bell adapted to rise and fall in the tank, a support arranged at one side of the tank and provided with a post projecting from its top, a spirally-arranged guideway on the support and around the post thereof, said guideway leading to the upper end of the said passage, and a valve carried by the bell for controlling the delivery of the carbid charge from the guideway to said passage, as set forth.

2. A gas-generator having a water-tank with an inclined submerged support for the charge, a vertical passage leading to said support and filled with water from said tank, a gas-bell adapted to rise and fall in said water-tank, an inclined guideway leading to the upper end of said passage, and a cut-off valve for controlling the charges passing from the guideway into the passage, said cut-off valve comprising a platform fixed on the tank, and vertical plates fixed to the bell and between which extends said platform, the plates having apertures at different levels, one of the apertures being adapted to register with the lower end of the inclined guideway, to allow a charge to pass from the guideway to the platform and the other being arranged to allow a charge to roll from the platform into said passage, as set forth.

3. A gas-generator having a water-tank, a submerged inclined support in the tank for the charges, a passage leading to the upper end of the support, a lever having front and rear cross-arms and mounted at about its center to swing over said support, one cross-bar of the lever being adapted to engage the carbid charges near the discharge end of the support to hold them thereon, and the other bar to swing down between the last two rows of charges on the support to retain the last row thereon, and means connected with said lever and extending to the outside of the tank, for manipulation by the operator, as set forth.

4. In a gas-generator, the combination with a tank, a vertical passage at one side of the tank and leading into the said tank at its lower end, and a bell mounted to rise and fall in the tank, of an inclined guideway leading to the upper end of the vertical passage, and a valve for controlling the delivery of the charges from the guideway to the passage, said valve comprising a platform secured to the tank and vertical and spaced plates secured to the bell and between which the platform projects, said plates having apertures at different levels, as and for the purpose set forth.

5. A gas-generator, comprising a tank having an inclined platform arranged above its bottom and provided with a vertical passage at one side of the tank, and leading at its lower end into the same above the platform, a bell in the tank, a spiral guideway leading to the upper end of the passage, a valve for controlling delivery of the charges from the guideway to the passage, said valve consisting of a platform on the tank and vertical plates on the bell and between which the platform extends, the plates being provided with apertures at different levels, a pivoted retaining and releasing device above the platform for alternately engaging with its ends the charges to retain and release them, a well on the side of the tank and into which the spent charges pass, and an elevating device in the said tank, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ELMER F. MACKUSICK.

Witnesses:

THEO. G. HOSTER,

EVERARD BOLTON MARSHALL.