(No Model.)

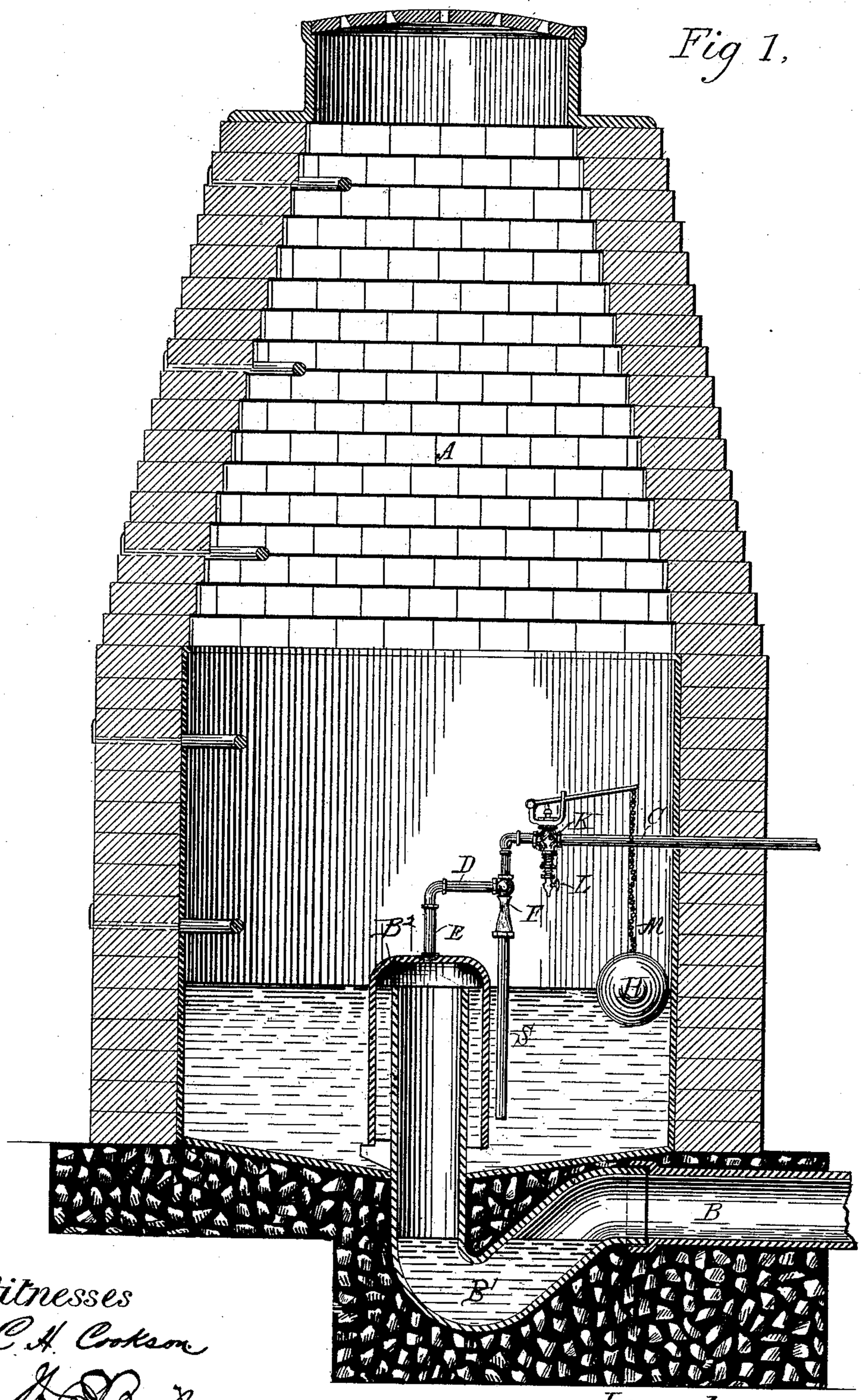
3 Sheets—Sheet 1.

A. ROSEWATER.

FLUSHING TANK.

No. 410,930. Patented Sept. 10, 1889.

Fig 1.



Witnesses
C. H. Cookson
H. L. Bailey

Inventor
Andrew Rosewater

(No Model.)

3 Sheets—Sheet 2.

A. ROSEWATER.

FLUSHING TANK.

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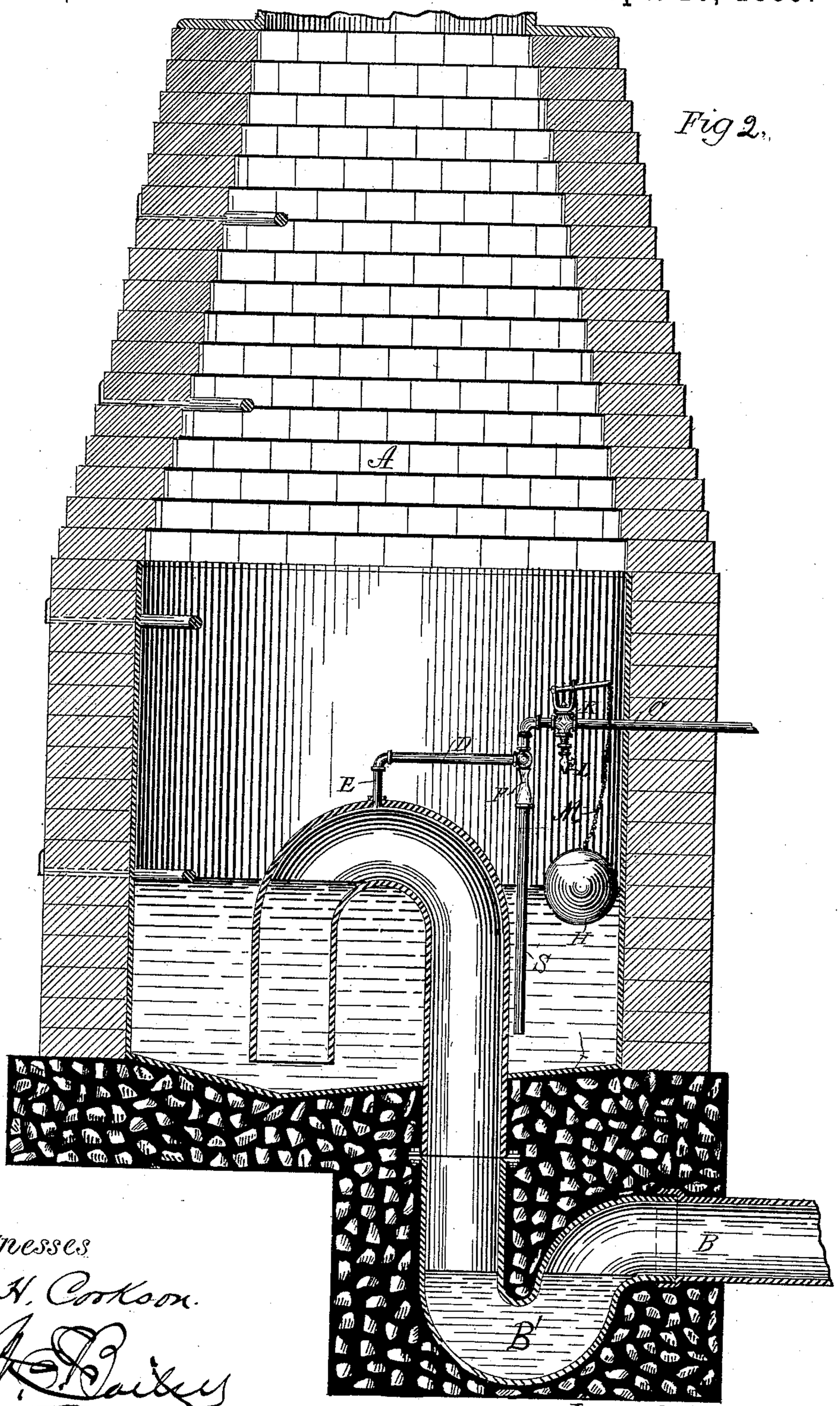
Fig 2.



Witnesses
C. H. Cookson.
J. D. Bailey

Inventor
Andrew Rosewater

(No Model.)

3 Sheets—Sheet 3.

A. ROSEWATER.

FLUSHING TANK.

No. 410,930. Patented Sept. 10, 1889.

Fig. 4.

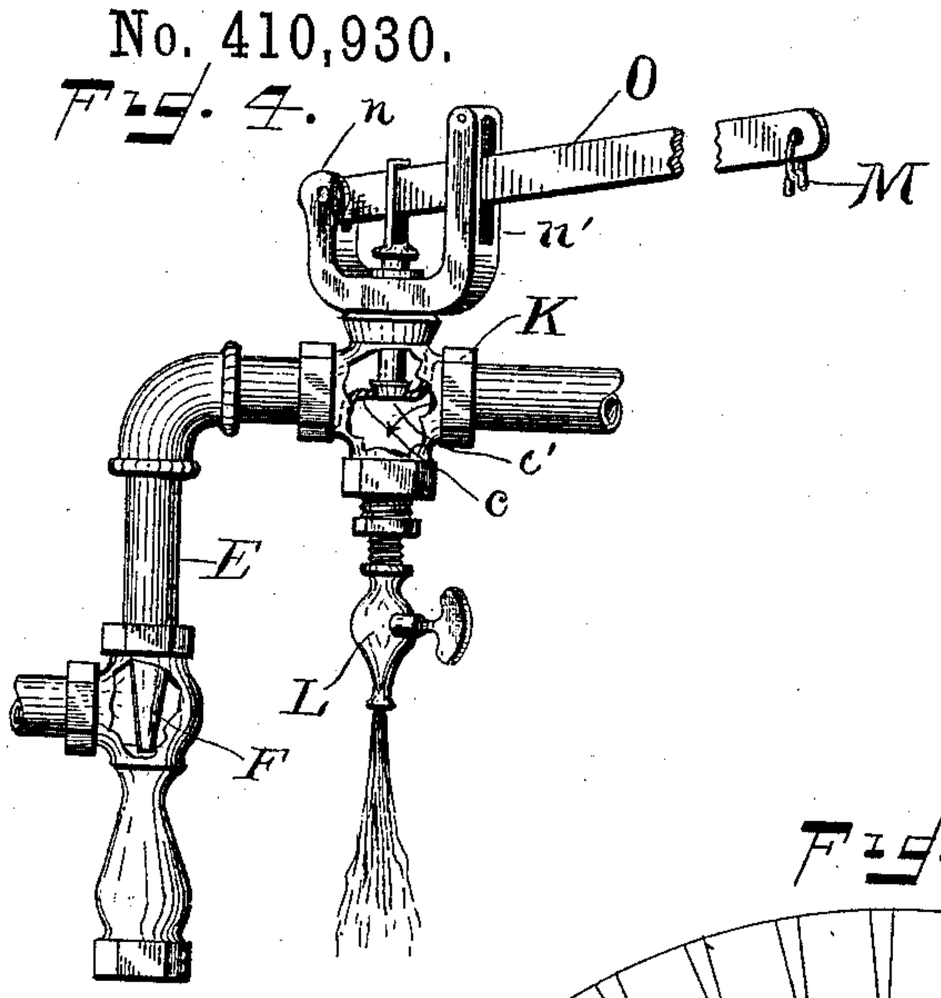


Fig. 5.

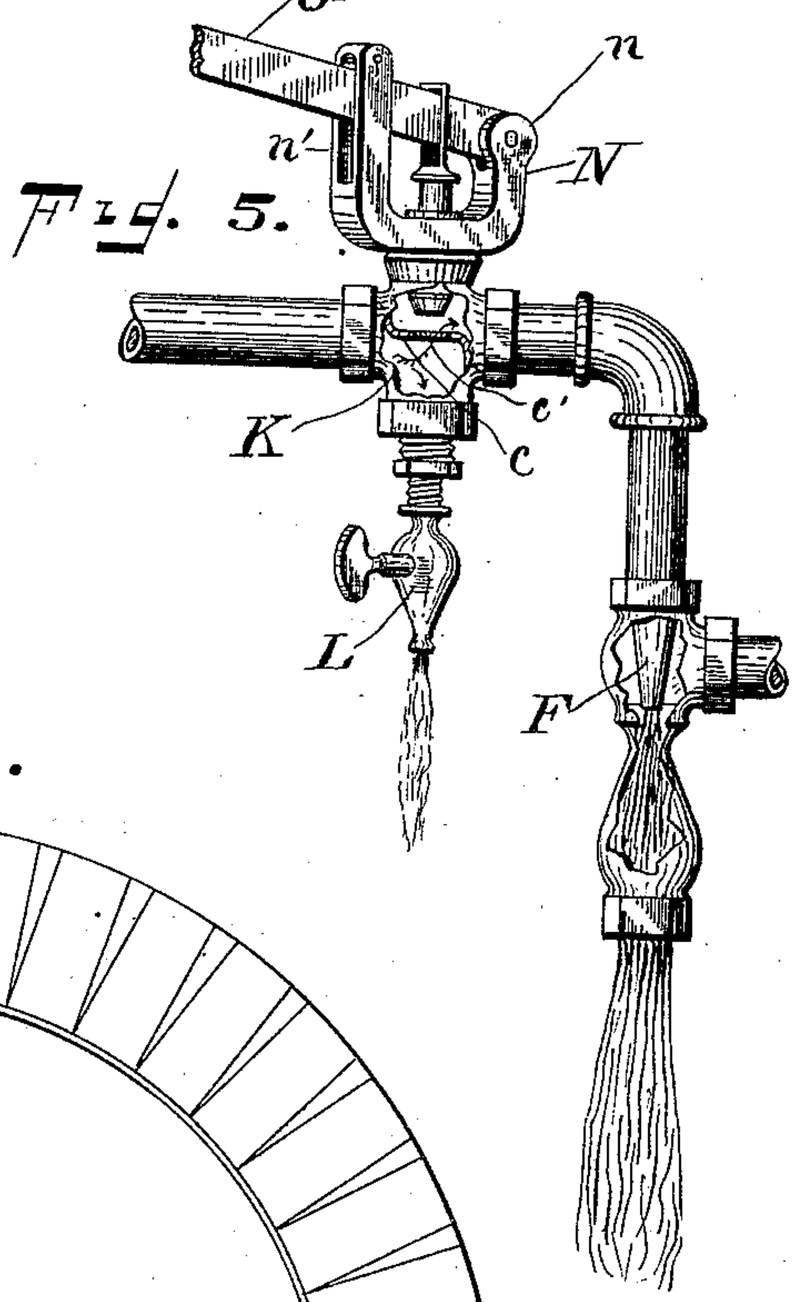
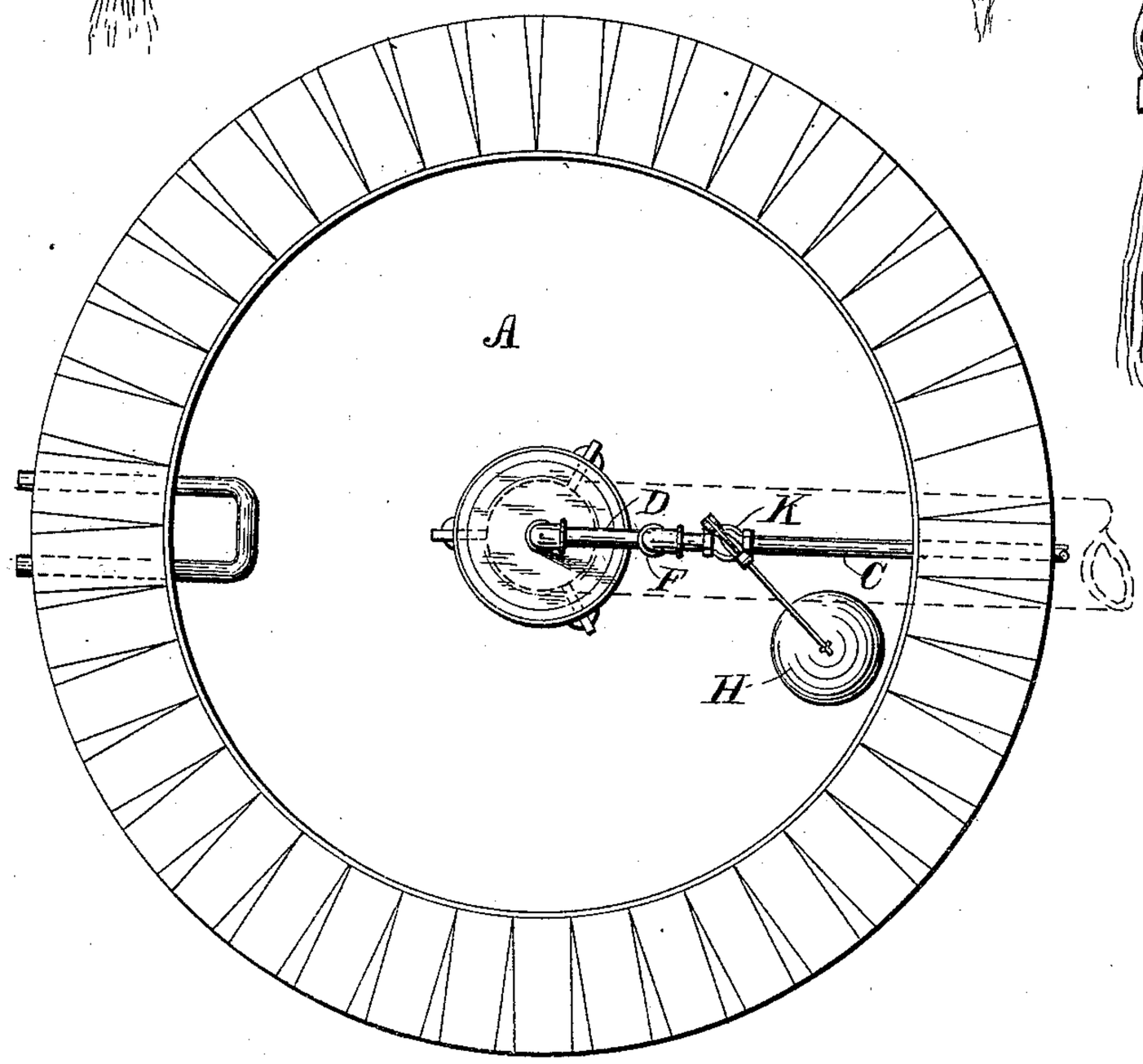


Fig. 3.



WITNESSES:

A. L. Morsell.

Dennis E. Jones.

INVENTOR:

Andrew Rosewater,

by Louis Bagger & Co.

his Attorneys.

UNITED STATES PATENT OFFICE.

ANDREW ROSEWATER, OF OMAHA, NEBRASKA.

FLUSHING-TANK.

SPECIFICATION forming part of Letters Patent No. 410,930, dated September 10, 1889.

Application filed February 27, 1889. Serial No. 301,140. (No model.)

To all whom it may concern:

Be it known that I, ANDREW ROSEWATER, a citizen of the United States, residing at Omaha, in the county of Douglas and State of Nebraska, have invented certain new and useful Improvements in Flushing-Tanks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to certain new and useful improvements in automatic flushing-tanks, and is designed more particularly as an improvement upon the devices shown in my patents, Nos. 343,069 and 343,853, heretofore granted to me.

The objects of the present invention are, first, to eliminate the special regulating air-supply pipes heretofore used and using the air-exhaust pipe also as an air-supply pipe, and, second, in making the siphonage more readily attainable with a slow inflow of water by the attainment of a maximum flow for exhausting the air just when needed and preventing irregularity of exhaust under different conditions of pressure and supply.

The invention consists in the peculiar combinations and the construction, arrangement, and adaptation of parts, all as more fully hereinafter described, shown in the drawings, and then particularly pointed out in the appended claims.

The invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, and in which—

Figure 1 is a vertical sectional view of a tank provided with my improved flushing device applied to the annular form of the siphon. Fig. 2 is a similar view showing the flushing device applied to an ordinary bent siphon. Fig. 3 is a horizontal section above the flushing device. Fig. 4 is a sectional detail, on an enlarged scale, with parts broken away. Fig. 5 is a detail view of a section of the supply-pipe and ejector or jet F, showing portions of each broken away, so as to disclose the interior arrangement, and also showing the valve in a closed position and omitting the pipe S; and Fig. 6 is a similar view with the valve open, so as to have the greatest flow through the jet F, also omitting pipe S.

The same letters of reference indicate corresponding parts throughout the several views.

Referring now to the details of the drawings by letter, A designates a tank provided with an outlet-pipe B, formed into a siphon and being provided with the trap B′. In Fig. 1 the upper end of the pipe B is surrounded by the cap B^2, leaving an annular space around the said pipe to form the well-known annular form of siphon. This cap has attached to its upper end the pipe D, which communicates with the interior of the siphon, as shown, and serves as an air-exhaust pipe connecting the ejector or jet, hereinafter referred to, with the siphon. The pipe D may be made of a single piece, if preferred, but I prefer to form it in two pieces, as shown, connected by the coupling and having the lower or vertical portion E connected to the top of the cap B′ by means of a screw-thread engagement to allow of its being readily removed when desired. In Fig. 2 the pipe B is bent at its upper end to form the well-known form of bent siphon, and the pipe E is connected to the same at the top of the bend, as shown.

C is the inlet-pipe through which the tank is filled. This inlet-pipe is provided with the jet or ejector F, regulating-cock L, valve K, float-weight H, and chain M, connecting the float-weight to the arm of the lever of the valve that holds the valve down or lets it up.

S is a vertical pipe, connected at its upper end with the lower end of the jet F, with its lower end terminating at a point above the base of the short leg of the siphon.

In order that one skilled in the art my fully understand the principle upon which the operation of the improved flushing-tank is based, a brief explanation is necessary.

The tank, it is needless to say, should always be water-tight from the base to a point above the water-line. Where sewers are near the surface and it is desired to use a large quantity of water at each flush, the tank can be built in a long rectangular form with walls slightly deeper than the casting and arched over with a man-hole at one end for inspection. This will answer good results with any

desirable quantity of water at a minimum depth. The form or size of tank, as will thus be seen, is not a condition to the successful operation of the siphon and can be designed to suit each particular case. The only requisite to assured operation is that the water-supply pipe entering the tank shall be large enough to supply either a fast or slow stream. The size of the supply-pipe will depend upon the distance of the tank from the water-mains. Ordinarily it should not be less than one-half an inch and vary from one-half to one inch in diameter. Where the pressure is low, it is always better to use a three-fourth-inch supply-pipe for distances of from thirty to one hundred feet, and one inch pipe for so much of the distance that is in excess thereof. The siphon, whether of the ordinary type or of annular form, (the shape being immaterial,) is set up in the tank. The base is trapped, so as to hold water enough for an air-seal at all times. At its top the exhaust-pipe D connects with the ejector F. From this ejector an air-pipe projects to a point several inches above the base of the short leg. Its upper end is connected with the water-supply pipe.

The operation of the tank is as follows: The water is first turned on by opening the cock L to the extent desired. It will gradually rise in the tank until the float H is raised thereby. As soon as the float rises sufficiently the pressure of the water from the water-main will open the valve-disk in K upward and water will flow through the ejector F, causing an exhaustion of air from the siphon. This air-exhaustion will continue until the water in the long leg of said trap shall have risen enough to counterbalance the water in the short leg of said trap, when it will suddenly recede and the resulting suction will start siphonage. This will continue until the tank is exhausted to a line with the base of the short annular leg B^2 of the siphon. As will be seen, while the water will continue entering the tank through the cock L, the flow through the ejector F will cease as soon as the float has lost its supporting-water and weighed down the valve-disk in K by its superior counterbalancing weight to that of the upward water-pressure in the supply-pipe. Figs. 4 and 5 of the drawings show in detail the position of the valve K when open and shut. The flow having been stopped through the ejector F, after the water has gone below the float air will begin to enter as soon as the water gets below the base of the pipe S, but not fast enough to stop the siphonage, which will continue till the base of the short leg of the siphon is reached. Fresh air, however, will completely reprime the siphon by its passage into the pipe S and through F and D during the interval of time that that water coming into the tank through L will occupy in rising from the base of the siphon to the base of S. Water will thus continue to rise until the float is again raised and the air is exhausted as before. This procedure will go on indefinitely as long as the material composing the tank and appurtenances will last.

The advantage of this over the appliances heretofore in use is this: Heretofore the water was passed directly through the ejector into the tank, and a special air-pipe connecting the inner surface of the siphon through the top or sides had its upper end terminating a little below the upper end of the long leg of the siphon. The water would rise if the pipe were large enough at its upper end, and thus closing it would cut off air, thus allowing the action of the ejector to exhaust air and start siphonage. The objection and difficulty experienced with its operation are, that if the flow through the ejector were very great it would, if the air-pipe were too small, gain on it and produce premature siphonage, and the siphonage once started would continue with the stream only equal to the inflow, because the ejector would exhaust air faster than it would come in, and hence repriming would be impossible. On the other hand, if the air-pipe were too large it would admit air so fast after siphonage that it would check and stop action long before the tank was exhausted. In either of these instances there was uncertainty of action without special adjustment for the particular pressure and rate of inflow. By the improvements herein described the adjustment is good from the start for slow or fast streams, as the ejector is only brought into action when water has reached near the top of the long leg, and being cut off from the water-supply shortly after it has started downward the pipe S is itself a medium of repriming, admitting fresh air through the same course that the air pursued when exhausting. Thus, as will be seen, the special air-regulating pipe is eliminated and rendered entirely unnecessary in the improved form, and positive action is secured under all circumstances.

It must be specially noted that the action of the siphon while improved by fast inflow is not dependent upon it, but will work with a slow stream.

The great advantage derived by the automatic valve K and continuous supply through L is the bringing into and cutting out of action of the ejector F when needed and when not needed, and the ease of adjustment of the repriming-pipe S.

From the foregoing description, taken in connection with the accompanying drawings, the operation, construction, and advantages of my improved flushing-tank will be readily understood. It will be seen that it involves simplicity of construction, certainty of continued operation, maximum speed of flush, economic operation—that is, certainty of action with any desired rate of inflow—little liability of derangement, and ready access to all parts subject to wear or repair.

It will be seen that a bracket N is mounted above the valve K, said bracket being provided with a bifurcated arm *n* and with an

opposite longitudinally-slotted longer arm n'. The lever O, which connects at one end with the chain M, has its other end pivoted within arm n and passes through the upper slotted end of the rod of valve K. From this construction it is plain that when the float is raised by the water the lever O is also raised by the pressure of the water, carrying with it the valve-rod and raising the valve disk, thus permitting the water also to pass to the jet F. On the other hand, the moment the water ceases to support the float the weight of the latter pulls the lever down and permits the valve to again close communication between the pipes C and F.

The inlet-pipe C is provided at the point where the cock L depends with the ordinary form of an inner partition c, provided with a valve-opening c'. This partition permits the inflowing water to enter beneath the valve, so that when pressure is released on said valve the upward pressure of the water will raise the same, and the water will pass through the valve-opening and thence flow into the jet F.

What I claim as new is—

1. The combination, with the tank, its supply-pipe and outlet-siphon pipe, of the vertical pipe S, connected with the supply-pipe and having its lower end terminating at a point above the lower end of the short leg of the siphon, the valve, and the float connected with said valve, substantially as and for the purpose specified.

2. The combination, with the tank, its supply-pipe and siphon outlet-pipe, of the ejector or jet F in said supply-pipe, the cock L, and the vertical pipe S, connected with the ejector or jet, and having its lower end terminating at a point above the lower end of the short leg of the siphon, the valve, and the float connected with said valve, substantially as and for the purpose specified.

3. The combination, with the tank, the supply-pipe, and the siphon outlet-pipe, of the vertical pipe S, the ejector or jet F in the supply-pipe and connected with the pipe S, the valve, and the float in the tank connected with said valve, substantially as and for the purpose specified.

4. The combination, with the tank, its supply-pipe and its siphon outlet-pipe, of the ejector or jet F in the supply-pipe, the pipe D, connecting the supply-pipe with the siphon, the vertical pipe S, connected with the ejector or jet and having its lower end terminating at a point above the lower end of the short leg of the siphon, the valve K, the cock L, and the float connected with the valve, all arranged and operating substantially as and for the purpose specified.

5. In a flushing-tank, the combination, with the supply-pipe provided with a partition having a valve-opening therein, and siphon exhaust-pipe, of the vertical pipe connected with the supply-pipe, the cock, the U-shaped bracket secured to the supply-pipe, having its shorter arm bifurcated and its longer arm slotted longitudinally, the valve-rod carrying on its lower end the valve and having its upper end slotted, the lever hinged in the bifurcated arm of the U-shaped bracket and passing through the slots of the valve-rod and longer arm, and the float connected to the free end of the lever by means of a chain, substantially as set forth.

6. In a flushing-tank, the combination, with an air-exhaust pipe from the siphon, of an ejector or jet connected therewith, a supply-pipe connected to the ejector or jet and provided with a depending cock for filling the tank, a valve for automatically causing an intermittent flow of a portion of the inflowing water to the jet or ejector supply-pipe, whereby a consequent intermittent exhaustion of the air from the siphon-pipe is attained, and a pipe connected to the jet or ejector for discharging the water admitted thereto, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

ANDREW ROSEWATER.

Witnesses:
G. B. HEUGEN,
J. F. HAMMOND.