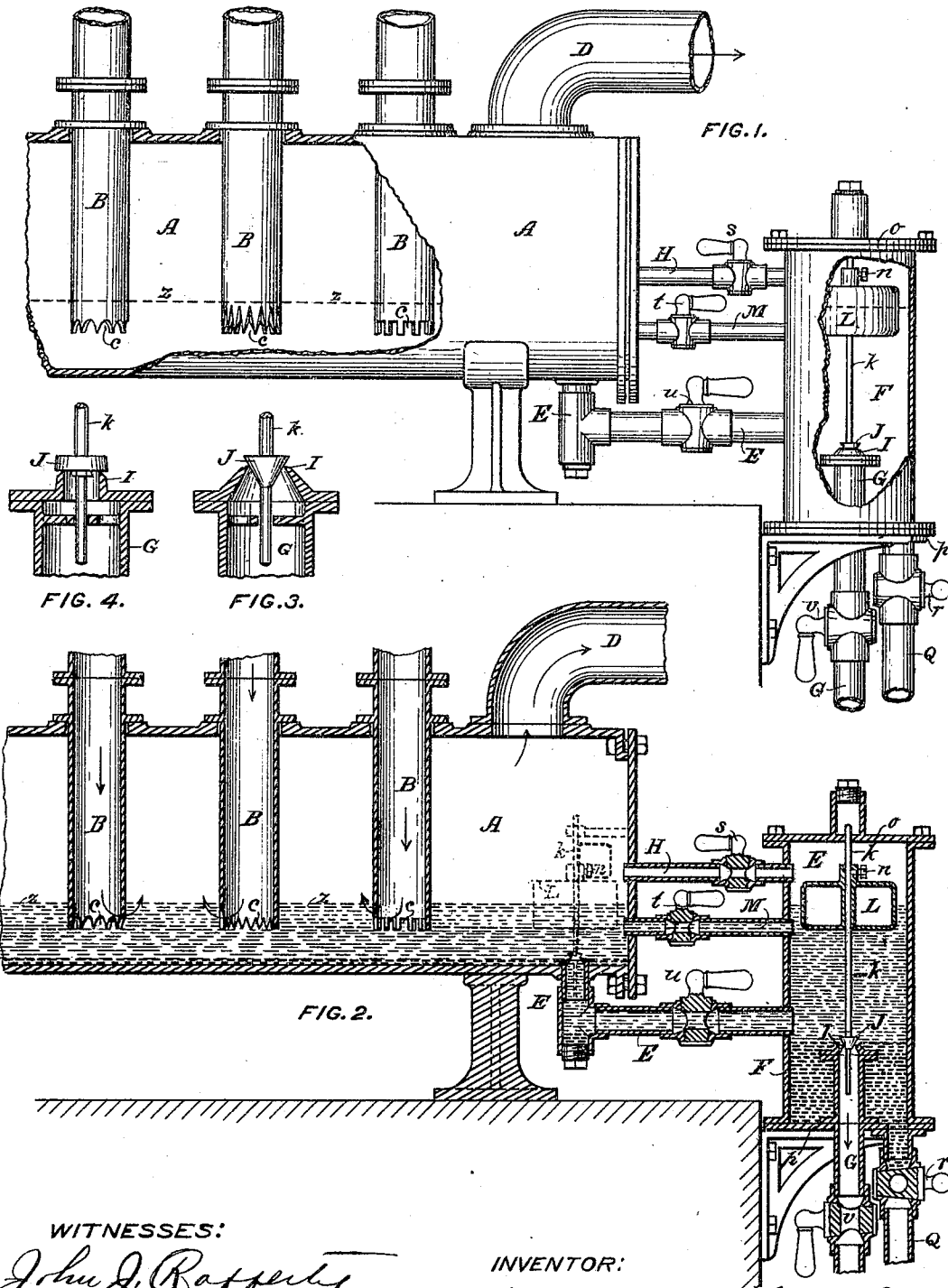


F. A. SABBATON.

HYDRAULIC MAINS FOR GAS WORKS.

No. 179,668.

Patented July 11, 1876.



WITNESSES:

John J. Rafferty
Austin F. Park.

INVENTOR:

Frederick A. Sabbaton

UNITED STATES PATENT OFFICE.

FREDERICK A. SABBATON, OF TROY, NEW YORK.

IMPROVEMENT IN HYDRAULIC MAINS FOR GAS-WORKS.

Specification forming part of Letters Patent No. **179,668**, dated July 11, 1876; application filed March 13, 1876.

To all whom it may concern:

Be it known that I, FREDERICK A. SABBATON, of the city of Troy, in the county of Rensselaer and State of New York, have invented certain Improvements in Hydraulic Mains for Gas-Works, of which the following is a specification, reference being had to the accompanying drawing, in which—

Figure 1 is a side elevation, partly in section, of an end portion of a hydraulic main for gas-works, with one form of my invention applied thereto. Fig. 2 is a central vertical longitudinal section of the same; and Figs. 3 and 4 are sectional views, on a larger scale, of valves suitable for use in the same apparatus.

This invention relates to apparatus for discharging the lower and heavier portion of the liquids from the hydraulic main of gas-works, and at the same time automatically maintaining the liquids at a uniform assigned height in respect to the sealing ends of the gas-inlet dip-pipes in the hydraulic main, however different or variable may be the pressure of the gas in the hydraulic main.

In the aforesaid drawing, A represents a part of the hydraulic main of an ordinary gas-works. Each dip-pipe, B, therein has its lower or sealing end notched, grooved, or fluted, so as to form a horizontal series of separate lateral passages, c, of any suitable size and shape, for the escape of the gas in a series of small streams from and around each dip-pipe, and below the level of the top Z of the liquid in the hydraulic main. I intend to make the above-described construction of the lower ends of the dip-pipes, in combination with the retorts and hydraulic main of a gas-works, the subject of another application. D is a pipe for conducting the gas from the chamber A.

The liquids in the hydraulic main consist, principally, of tar, ammonia-water, light oils, and some other matters distilled with the gas from the coal or other gas producing material. The tar is of greater specific gravity than the water, and settles to the bottom, and the light oils float at the top. The surplus liquid is commonly drawn off by an outlet-pipe, located at the height at which the liquid is to be maintained over the ends of the dip-pipes, so that the lighter oils and liquids are first discharged, leaving the heavier tar to settle to the bottom

and there thicken and accumulate to or above the lower ends of the dip-pipes, so as to more or less obstruct the delivery of the gas from those pipes and produce injurious back pressure in the retorts. If the liquids were drawn off from the bottom only of the hydraulic main, so as to discharge the tar and leave the lighter liquids and oils, the back pressure on the retorts would be lessened, and the gas might be more enriched and purified by rising from the dip-pipes through such lighter oils and liquids.

Devices have been heretofore proposed for drawing the liquid from the lower portion of the hydraulic main by means of a passage rising from the bottom part of the main to the height at which the liquid was to be maintained in the main, and with or without a gate or valve at the top, whereby a person could alter that height. But in such cases the height of the liquid in the hydraulic main and above the ends of the dip-pipes therein was considerably greater whenever the rising discharge-passage was filled with and was discharging the heavy tar than when that passage was filled by and was delivering the lighter ammonia-water, as would often occur in practice; and in some such cases an increase in the pressure of the gas in the hydraulic main—as from the stoppage or tardy action of the exhauster—would force out the liquid to below the proper level, and, perhaps, entirely unseal the dip-pipes.

To obviate those defects I have a discharge-passage leading from the lower part of the liquid in the hydraulic main, and furnished with a valve that is connected to a float, which is in and supported by the liquid in the hydraulic main, or, preferably, in a supplemental chamber communicating by a narrow passage or passages with the gas and liquid in the hydraulic main, so that as the liquid in the hydraulic main shall be increased in quantity, the float will be thereby raised, and will, consequently, open the valve and let out a corresponding quantity of the lower portion only of the liquid, and thereby automatically maintain the liquid at a uniform height in respect to the dip-pipe or dip-pipes in the hydraulic main, whatever shall be the variations in the pressure of the gas therein upon the liquid.

In the aforesaid drawing, an outlet-passage for liquids leads from the bottom part of the

hydraulic main A through the pipe E into the lower part of a closed chamber, F, and thence by a pipe, G, to a tar-well or any other suitable receptacle. The upper portion of the interior of the chamber F is above the level of the surface of the liquid in the hydraulic main, and has communication by a pipe, H, with the gas-space over the liquid in the hydraulic main, so that the gaseous pressure in the upper portion of the chamber F shall be the same as in the hydraulic main, and so that the liquid in the hydraulic main and in the chamber F shall constantly counterbalance each other. M is a pipe leading from the upper portion of the liquid in the hydraulic main A into the upper part of the liquid in the chamber F, so that the liquid above the discharge-pipe G in the chamber F shall always be of substantially the same quality and specific gravity, and shall, consequently, stand at substantially the same height as the liquid in the hydraulic main; or the same result may be secured by having one deep narrow passage in the place of the two pipes H and M, or M and E, or in the place of the three pipes E, M, and H.

On the upper end of the pipe G, and in the lower portion of the chamber F, is a valve-seat, I, (shown on a larger scale in Figs. 3 and 4,) and a valve, J, fitted to the seat, and secured upon or to an endwise-movable rod, *k*, to which is fastened a float, L, at such a height that when the liquid in the hydraulic main shall be at the assigned height in respect to the lower ends of the dip-pipes B, the float L will then be almost entirely supported by the liquid in the chamber F, and will then just close the valve J against its seat I, and thereby prevent the escape of any of the liquid, and so that as more liquid shall be distilled, and thereby added to the liquid in the hydraulic main and chamber F, the float L will be thereby raised, so as to open the valve J just enough to let the surplus liquid escape from the bottom part only, and thus maintain the liquid at the assigned height in the hydraulic main, whatever variations shall occur in the pressure of the gas therein, and so that the tar and heaviest liquids shall be drawn from the hydraulic main as fast as produced, and that the lighter liquids and oils shall be constantly left therein. The valve J should have a narrow bearing against its seat I, to insure the sensitive opening and closing of the valve by the float.

In order that the liquid may at different times be maintained at different assigned heights in respect to the sealing ends of the dip-pipes in the hydraulic main, I make the float L adjustable, so that it can be fastened at different heights upon the rod *k* by means of a set-screw, *n*, whenever the detachable cover *o* of the chamber F shall be temporarily removed. I also contemplate securing the same object by having the valve J similarly adjustable on the rod *k* at different distances from the float, or by having the discharge-

pipe G adjustable by screwing or sliding endwise through the bottom *p* of the chamber F, so that the valve-seat I, valve J, and float L can be thereby set at different heights in that chamber.

Q is a pipe, which is to be kept closed by a plug or cock, *r*, except while accumulated sediment is being drawn from the lowest portion of the chamber F. Each of the pipes H M E has, by preference, a stop-cock, *s t u*, and is to be kept open in use, except when the cap *o* is to be temporarily removed from the chamber F in adjusting the float, or when the liquid is to be drawn out of that chamber without escape of gas or liquid from the hydraulic main. The pipe G may also have a cock, *v*, by which that pipe may be temporarily closed.

Instead of having the float L, rod *k*, valve J, and seat I in the chamber F, they may be applied to the discharge-pipe E in the hydraulic main A, as indicated by dotted lines in Fig. 2; but I commonly prefer to have them in a supplemental chamber connected with the hydraulic main, substantially as hereinbefore set forth, in order to prevent or lessen the agitation of the float by the gas issuing through the liquid from the dip-pipes, and for greater convenience in applying the same in connection with hydraulic mains, as heretofore commonly constructed and already in use.

Whenever the supplemental chamber F shall be dispensed with, and the connected valve and float shall be arranged in the main chamber A, and in connection with a valve-seat on the top of the pipe E, that pipe may be made adjustable endwise, so as to set the valve-seat, valve, and float higher or lower; or, by having a suitable hand-hole in the casing of the chamber A, the float can be adjusted on its stem by a set-screw to different heights above the valve, so that the float and valve can be thereby made to keep the liquid at any suitable different heights in the main chamber, under either equal or different pressures of the gas therein.

What I claim as my invention is—

1. In combination with a chamber having therein a gas-inlet dip-pipe, arranged to be sealed by liquid of varying specific gravity, and to which more is being added, an outlet-passage, valve, and float, to discharge only the lower and heavier portion of the liquid, and thereby maintain the liquid at a uniform height in respect to the sealing end of the dip-pipe, under varying pressure of the gas upon the liquid in the chamber, substantially as described.

2. In combination with a chamber having therein a gas-inlet dip-pipe, arranged to be sealed by liquid of variable specific gravity, and to which more is being added, an outlet-passage, valve, and float, made adjustable, substantially as hereinbefore described, so that while only the lower portion of the liquid shall be discharged, the device can be readily adjusted to maintain the liquid at different

heights in respect to the dip-pipe, under either uniform or different pressures of the gas in the chamber.

3. The combination, with a main chamber, A, having therein a dip-pipe, B, arranged to be sealed by liquid of varying specific gravity, and to which more is being added, of a float, L, valve J, and outlet-passage G, in a supplemental chamber, F, having communica-

tion with the main chamber by the passages E M H, substantially as described.

In testimony whereof I hereunto set my hand in the presence of two subscribing witnesses this 7th day of March, 1876.

FREDERICK A. SABBATON.

Witnesses:

JOHN J. RAFFERTY,
AUSTIN F. PARK.