(No Model.)

G. A. HYDE, Jr.

OVERFLOW GATE AND LIQUID SEPARATOR.

No. 428,613. Patented May 27, 1890.

Fig. 2.

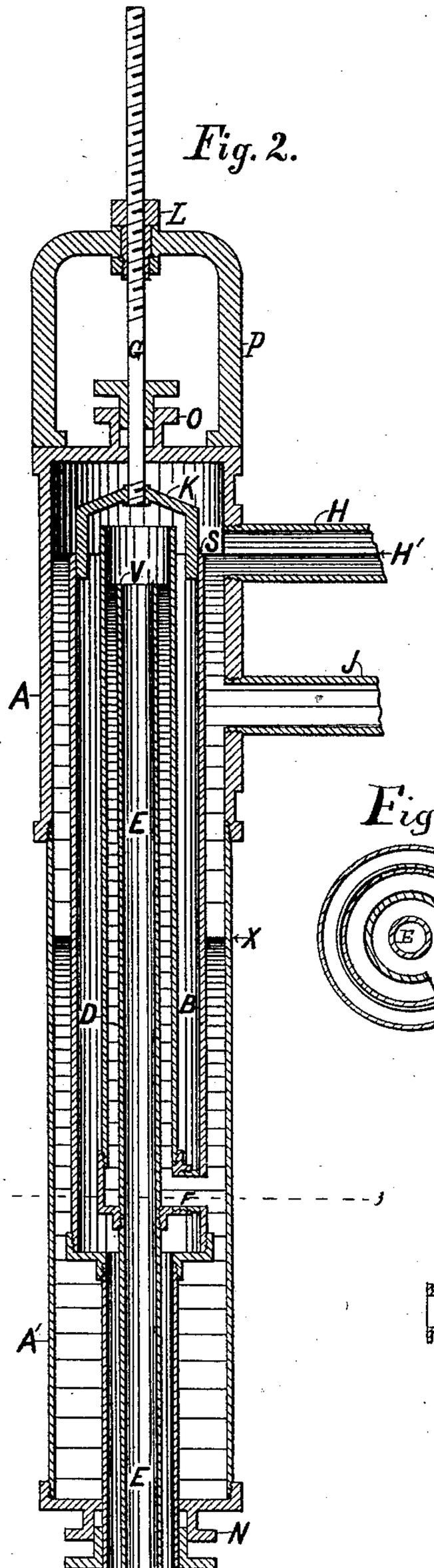
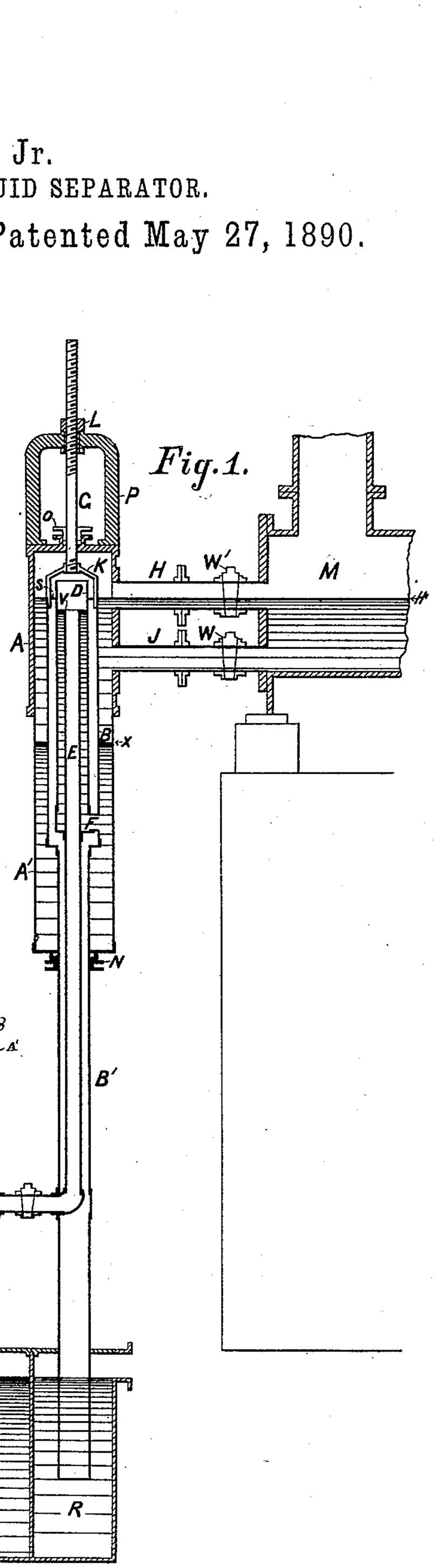


Fig. 3.

Fig. 1.



WITNESSES:

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OVERFLOW-GATE AND LIQUID-SEPARATOR.

SPECIFICATION forming part of Letters Patent No. 428,613, dated May 27, 1890.

Application filed April 15, 1889. Serial No. 307,372. (No model.)

To all whom it may concern:

Be it known that I, GUSTAVUS A. HYDE, Jr., a citizen of the United States, residing at East Saginaw, in the county of Saginaw and State of Michigan, have invented a new and useful Combined Overflow-Gate and Liquid-Separator for Liquids of Different Specific Gravities, of which the following is a specification.

My invention relates to devices for the removal of liquids from apparatus commonly in use in the manufacture and purification of gas, and has for its objects, first, the adjustment of the levels of liquids contained in such apparatus, and, secondly, the removal of either the heavier or the lighter liquid as fast as deposited without deranging the surface-level of the other lighter or heavier liquid.

Having thus described the purposes of my invention, I will proceed to specify its details and operation, reference being made to the accompanying drawings, forming a part of this specification.

Similar letters designate like parts in all the figures.

Figure 1 shows a vertical section of my invention as attached to the hydraulic main commonly in use in gas-works. Fig. 2 shows an enlarged section view of my invention. Fig. 3 is a horizontal section through the device on the line 3 3, Fig. 2.

A A′ is a cistern to receive the lighter liquid and tar through the conducting-pipes H at the surface-level of the lighter liquid and J at the bottom of the hydraulic main M, the tar from its greater specific gravity settling to the bottom of the cistern.

It is requisite to the working of my invention that the gas-pressure from the main M be admitted to the upper part of the cistern A A′ either through the pipe H, as shown, or through a pipe especially provided for the purpose.

Within the cistern A A′, and adjustable vertically therein and passing through the packing-box N in the bottom of the cistern A A′, as shown, is a system of vertical tubes B, B′, D, and E, arranged concentrically one within the other, so as to form annular cylindrical spaces, which, with the unions E′ and F′ and connecting-tube F, constitute the gate and separator, to be described hereinafter, the same being adjustable vertically by means of the bail K, threaded gate-stem G, nut L, and brace P. The gate-stem G is provided with packing-box O on the cistern A A′, substantially as shown, and for the purpose of making a gas-tight joint.

The gate is so constructed that the tube B determines the level of the lighter liquid only, all surplus liquid above its upper edge S falling over the edge S and descending by gravity between the tubes B and D to the tube B′, thence to the dip seal-box R, and escaping.

Within the gate-tube B, and connected thereto near its base by means of the tube F and joint E, is the concentrically-located tube D, terminating at a higher level than the gate-tube B, and forming a secondary cistern having an open way through the tube F to the contents of the cistern A A′, as shown, so that the contents of the cistern A A′ have free access to the cistern within the tube D. Concentrically located within the tube D, and continuing downward through the bottom of the same and within the tube B′ and out of the tube B′ to the dip seal-box T, substantially as shown, is the overflow-tube E, rigidly fixed relative to the above-mentioned system of tubes B B′ D E F, and thus adjustable vertically and simultaneously with the system of tubes B, B′, D, E, and F through the means of the above-mentioned adjusting device K, G, L, and P.

I will now proceed to describe the action and operation of my invention.

Having first filled the cistern A′ with tar to a point considerably above the level of the tube F, which procedure is required but once, and having adjusted the system of tubes forming the combined overflow-gate and separator B B′ D E F through the means of the adjusting mechanism, as before described, so that the edge S of the gate-tube B is at the level H′ required of liquid in the hydraulic main M, the cocks W and W′ of the conducting-tubes J and H, respectively, are opened, thus allowing the liquids in main M to flow into the separator, as before described. Owing to the greater specific gravity of the tar deposited, as before mentioned, in the main M, the tar as soon as deposited flows out of the main M through the conducting-pipe J and settles in the cistern A A′ and by displace-

ment through the tube F to interior of tube D. Because of the overflow-tube E terminating at a lower elevation V than the gate-tube B at S, and the cistern D being filled with tar of greater specific gravity than the lighter liquid in the upper part of the cistern A A′, a balance of the two liquids is maintained, whereby the shorter column of denser liquid or tar in cistern D equals in pressure the longer column containing in part the lighter liquid in cistern A A′, and the division between the two liquids will be at some level, as X, between tube F and pipe J in the cistern A A′, as shown in Fig. 2.

It is obvious from the foregoing description that as rapidly as the tar flows into and settles in the cistern A A′ a like amount of tar is displaced and flows downward and within the tube E to dip seal-box T, and that as the lighter liquid flows into cistern A A′ in like ratio does it flow down and within the tubes B and B′ to dip seal-box R. Thus my invention maintains constantly a certain level of the lighter liquid, removing all surplus as formed and deposited, and also separates and removes therefrom the tar as rapidly as it is in like manner deposited.

The cistern-tube D terminates at a higher level than the gate-tube B, in order to prevent any of the lighter liquid from getting into cistern D while in its passage down and within gate-tube B, thereby preventing any derangement of the liquid-balance hereinbefore referred to and contaminating the otherwise pure tar separated.

Having fully described my invention and the method of its operation, I claim as my invention and desire to secure by Letters Patent—

1. A combined overflow-gate and liquid-separator comprising a cistern with interior concentric tubes of different heights constituting an overflow-gate, and a passage affording communication between the cistern and the lower part of one of the tubes, as described.

2. A combined overflow-gate and liquid-separator comprising a cistern, concentric tubes within the same extending upward to different heights, the outermost tube determining the level of the lighter liquid and the innermost tube determining the level of the heavy liquid, and a passage affording communication between the cistern and one of the interior tubes, as described.

3. A combined overflow-gate and liquid-separator comprising a cistern, a series of concentric tubes producing a central passage and concentric cylindrical passages, a communication between the central annular passage in its lower part and the cistern, and communications at predetermined levels between the outer annular chamber and the cistern and the central annular chamber and the central passage toward their upper ends, as described.

4. The combination, with the cistern A A′, of the concentric tubes B D E, producing the annular chambers shown, the passage F between the cylinder and the tube D, and the dip-pipes connected with the concentric tubes, as described, the said concentric tubes having their upper terminations at different levels, for the purpose set forth.

5. The combination, with the cistern and the series of concentric tubes contained therein, having their upper terminations at different levels and communicating with the cistern and dip-pipes, of an adjusting device comprising a bail secured to the series of tubes and mechanism for raising and lowering the same, substantially as described.

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Witnesses:
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