No. 686,846. Patented Nov. 19, 1901.

S. FORTER.

LIQUID CONTROLLED VALVE.

(Application filed June 19, 1901.)

(No Model.) 2 Sheets—Sheet 1.

Fig. I.

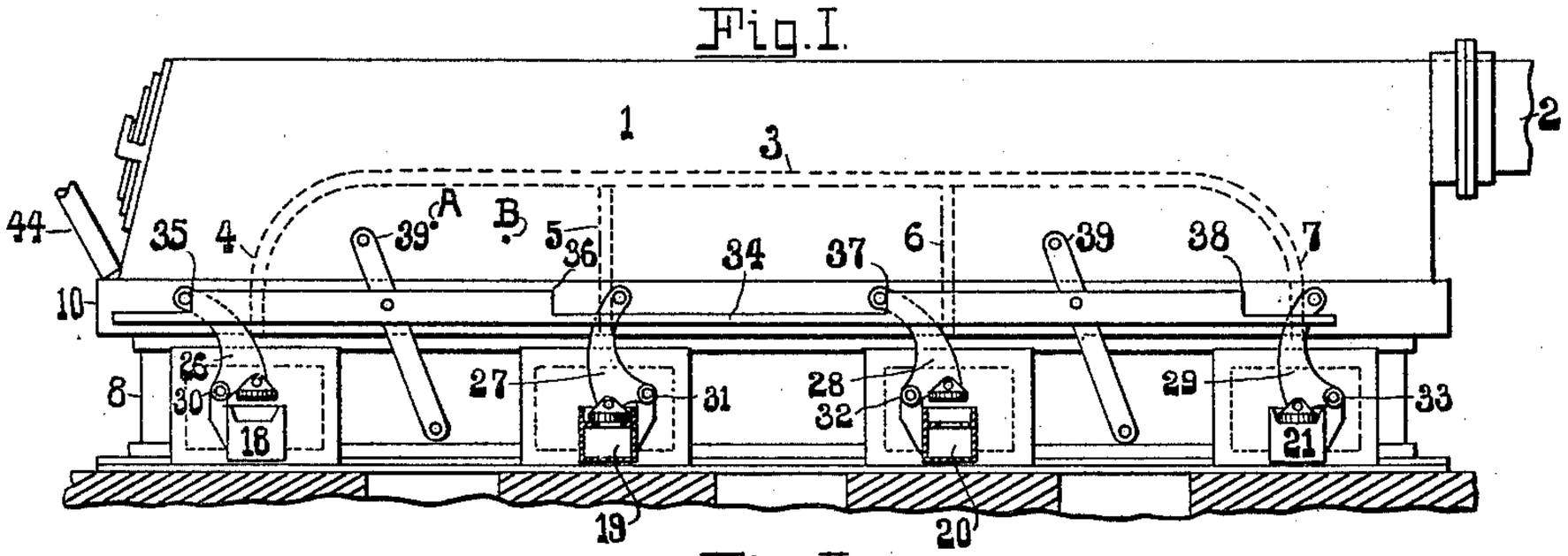


Fig. II.

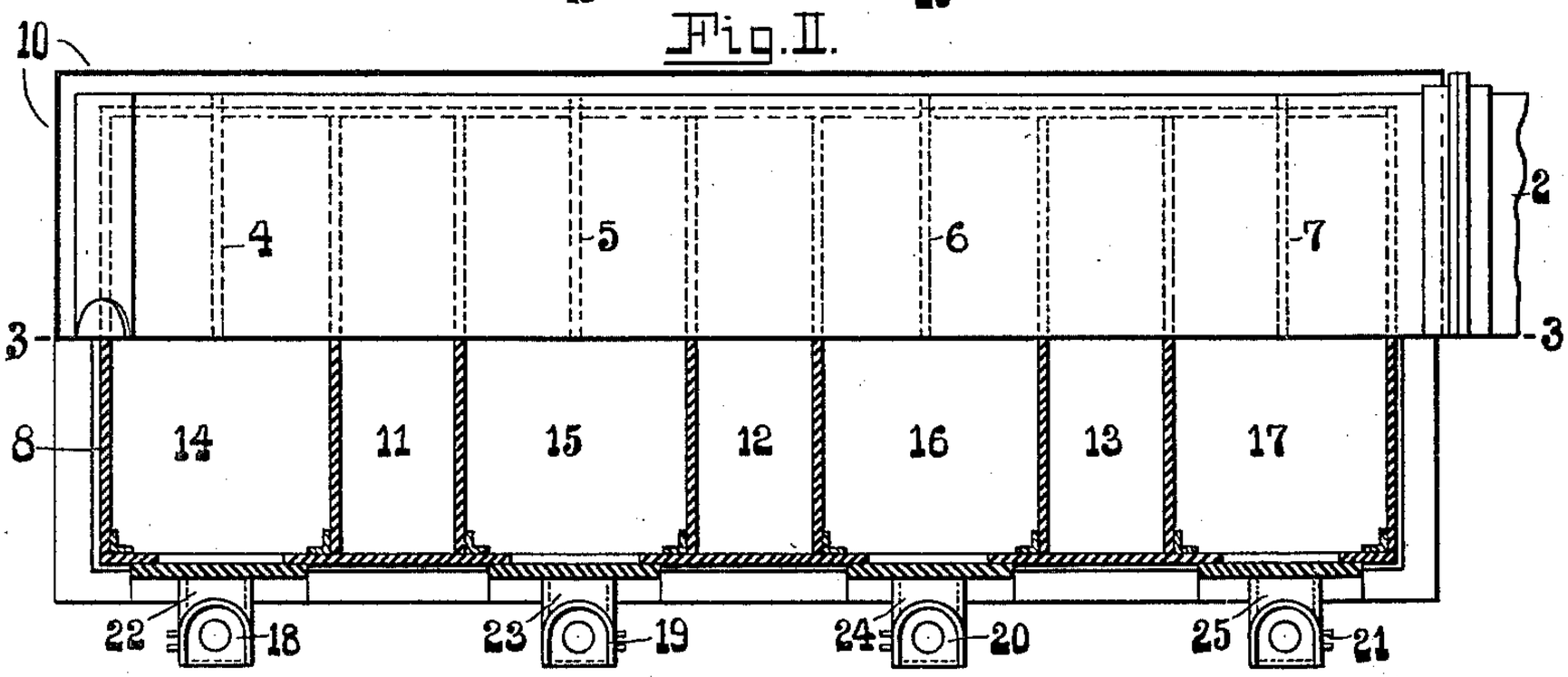


Fig. III.

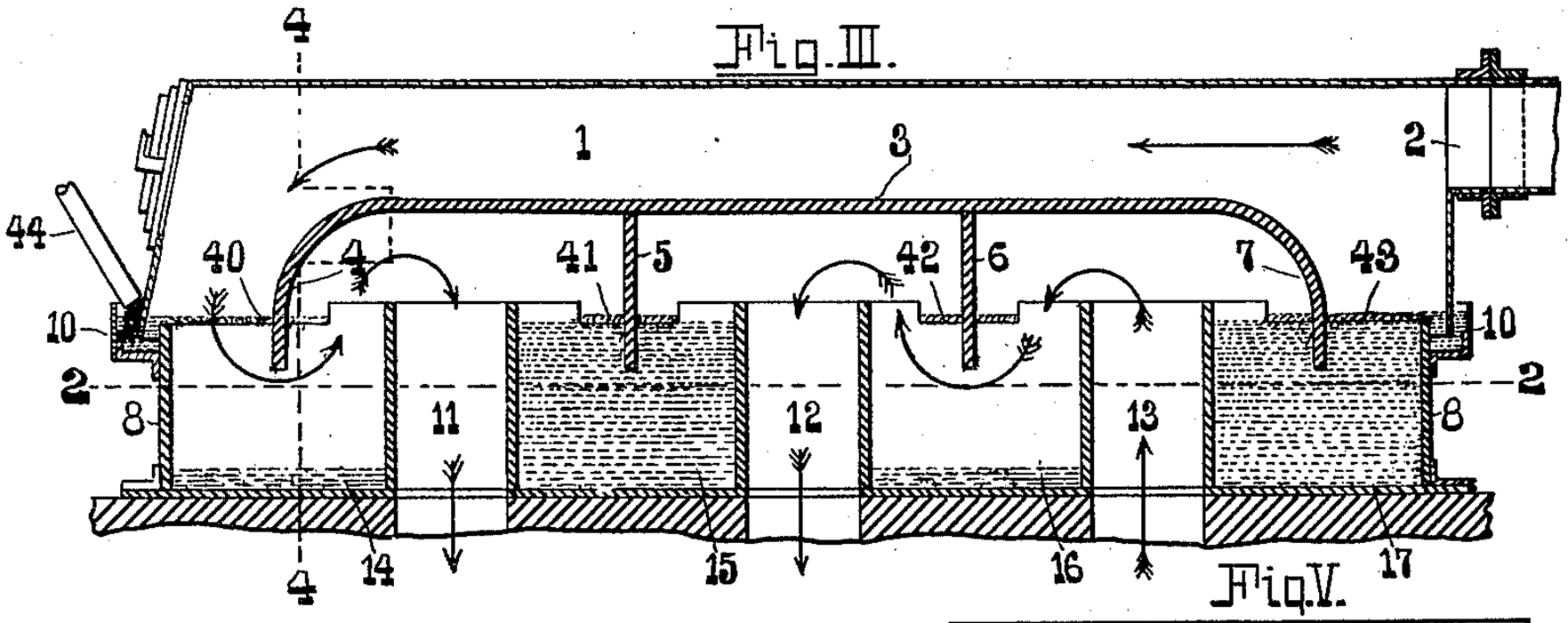


Fig. IV.

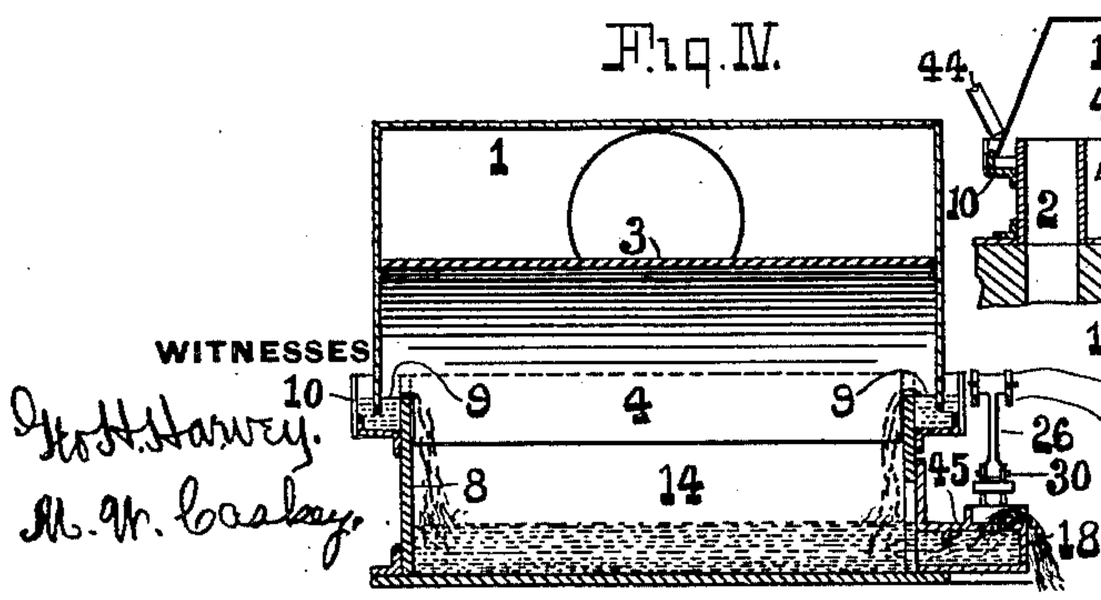
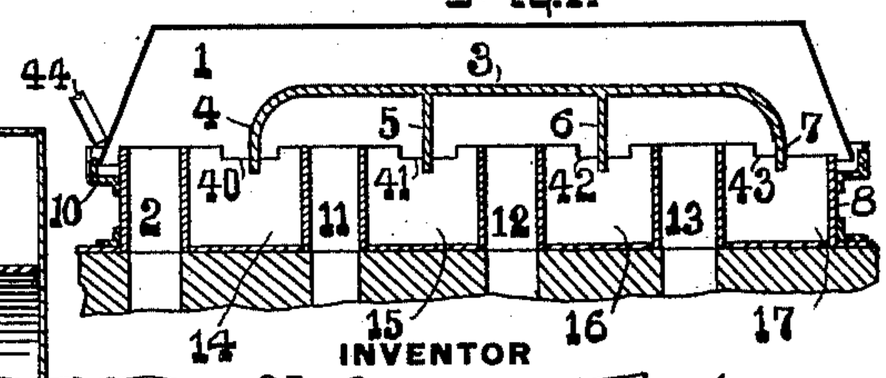


Fig. V.



WITNESSES

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No. 686,846. Patented Nov. 19, 1901.

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LIQUID CONTROLLED VALVE.

(Application filed June 19, 1901.)

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Fig. VI.

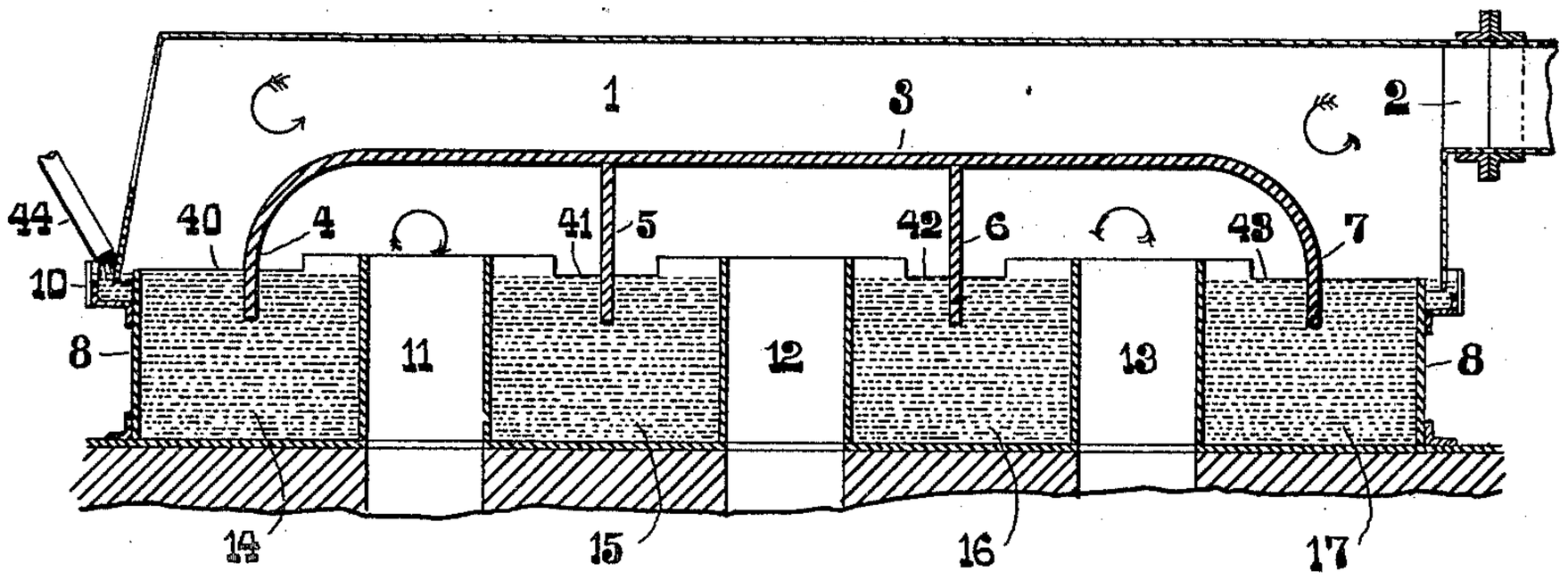
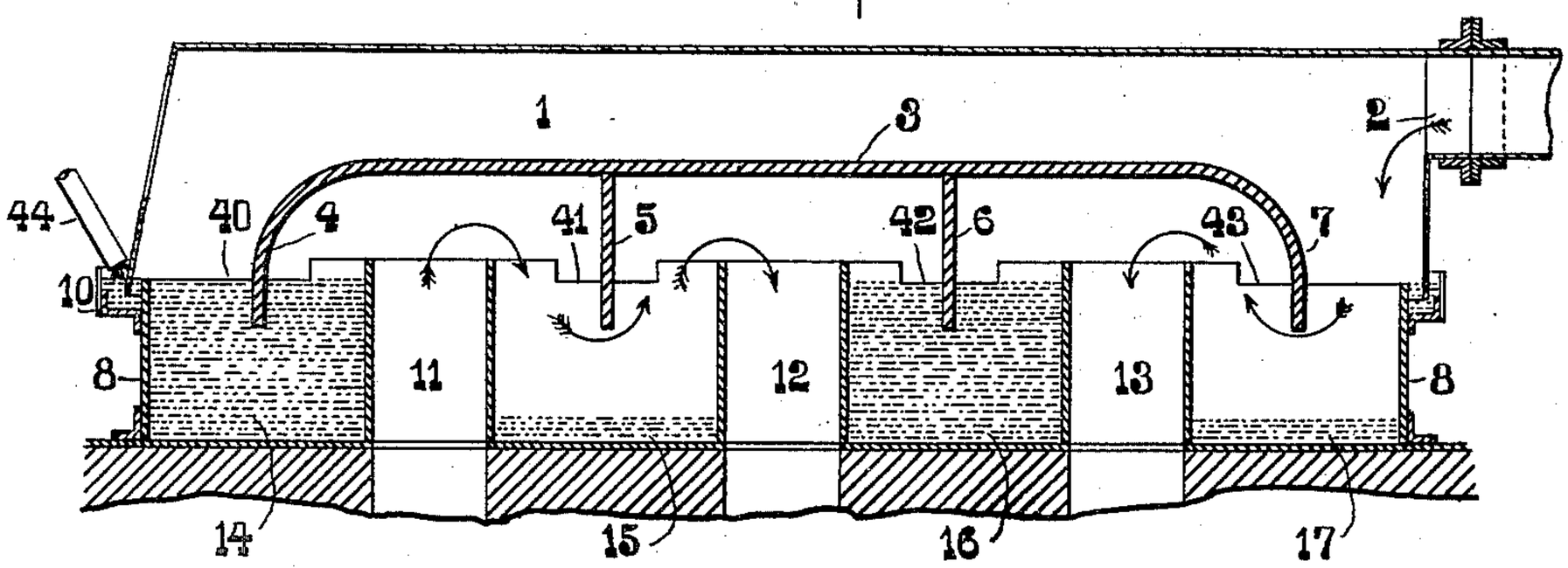


Fig. VII.



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UNITED STATES PATENT OFFICE.

SAMUEL FORTER, OF BELLEVUE, PENNSYLVANIA.

LIQUID-CONTROLLED VALVE.

SPECIFICATION forming part of Letters Patent No. 686,846, dated November 19, 1901.

Application filed June 19, 1901. Serial No. 65,162. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL FORTER, a citizen of the United States, residing at Bellevue, in the county of Allegheny and State of Pennsylvania, have invented or discovered new and useful Improvements in Liquid-Controlled Valves, of which the following is a specification.

In the accompanying drawings, which make part of this specification, Figure I is a side elevation of a liquid-controlled valve. Fig. II is a plan view, partly in section, on line 2 2 of Fig. III. Fig. III is a vertical longitudinal section on line 3 3 of Fig. II. Fig. IV is a vertical cross-section on line 4 4 of Fig. III. Fig. V is a vertical longitudinal section showing the main gas-inlet through the bottom instead of the side or top of the valve. Figs. VI and VII are sectional views similar to Fig. III.

The object of my invention, generally stated, is to provide means whereby the flow of gas or air through what is technically termed the "reverse-valve" of a regenerative or other furnace can be controlled at the will of the operator without the use of internal operative mechanism. My mechanism is also adapted to other uses of analogous character or may be used as a cut-off valve.

A further object is to provide means for preventing an accumulation of by-products—such as tar, soot, &c.—in the sealing-chambers, which are washed out on each reversal of the valve. I also provide simple and efficient means whereby the valve-ports are absolutely closed during the reversing of the gas or air currents through the valve, and consequently there can be no waste of gas escaping up the chimney-flue, as frequently occurs with other forms of reversing-valves.

Another object of my invention is to facilitate the reversing of valves of large dimensions by obviating the necessity of moving heavy parts of the valve during its reversal.

It will be seen from Fig. I that it requires very little power to reverse my valve, even of the largest size, as no parts of considerable weight need to be moved, the reversing being effected by simply opening and closing alternately the small auxiliary overflow-valves 18, 19, 20, and 21.

In the accompanying drawings, 1 represents a valve-casing having a gas or air inlet 2 and a valve-hood or valve proper, 3, provided with flanges 4, 5, 6, and 7. These flanges project downwardly a short distance below the top of the bed-plate or valve-seat 8. Valve-casing 1 is supported upon the top of bed-plate 8 by means of the flanges 4, 5, 6, and 7, which are cut away, as indicated at 9 9 in Fig. IV, affording a means whereby the sides and ends of the casing 1 remain suspended in the trough 10. In the bed-plate 8 are shown vertical passages 11, 12, and 13. The walls of these passages, in conjunction with the sides and ends of the bed-plate 8, form the compartments 14, 15, 16, and 17. Auxiliary valves 18, 19, 20, and 21 are secured to the exits 22, 23, 24, and 25 of said compartments. Connected to auxiliary valves 18, 19, 20, and 21 are valve-levers 26, 27, 28, and 29. These levers are operative through the fulcrums 30, 31, 32, and 33, transversely-moving bar 34, shoulders 35, 36, 37, and 38, and levers 39 39.

40, 41, 42, and 43 represent slots cut into the sides and ends of the bed-plate 1. 44 is the water-supply pipe.

In the operation of my invention by assuming lever or levers 39 to be in a vertical position or moved over to point A, as indicated in Fig. I, the auxiliary valves 18, 19, 20, and 21 would be closed. Water would then be permitted to flow through pipe 44 into trough 10, filling the trough, so that it would flow over the slotted portions 40, 41, 42, and 43 of the upper edges of the ends and sides of the bed-plate 8 and into the compartments 14, 15, 16, and 17 of the bed-plate 8 until it rises in said compartments to a level with the flow from the trough 10. (See Fig. VI.) At that level the passages 11, 12, and 13 are cut off from communicating with each other through the valve by the lower ends of the flanges 4, 5, 6, and 7, being below the water-line in said compartments. When the water reaches to a level in the compartments and the trough, it can continue to rise until it overflows the outside of the trough 10. This I provide for by making the outer flange of the trough 10 on a lower horizontal plane than the top edge of the sides of the bed-plate 8. The advantage of this construction is that it will be impossible for the water to

enter the vertical passages 11, 12, and 13. Assuming the compartments to be filled with water, as above described, the next operation would be to empty either of the sets of alternative compartments, so that a passage would be opened to the flue or vertical passage 12. This is accomplished as indicated in Figs. I and III, wherein when the lever 39 is pushed over to the position as shown in Fig. I from the position marked A, same figure, the shoulders 35 and 37 will bear against the ends of valve-levers 26 and 28, causing, through fulcrums 30 and 32, the said valve-levers to rise from the valve-seats and permitting the water contained in compartments 14 and 16 to escape through the exits 22 and 24 and out through the auxiliary valves 18 and 20, emptying the compartments to the water-line indicated in Fig. IV, wherein 45 represents a downwardly-projecting flange, which acts as a seal to prevent the escape of gas through the auxiliary valves 18, 19, 20, and 21. Compartments 14 and 16 being unsealed, the gas or air passes through inlet 2 and between the casing 1 and central hood 3 into compartment 14 around flange 4, out of compartment 14 and into vertical passage 11, and out to the furnace. The waste gases pass up vertical passage 13, down into compartment 16, under flange 6, up and out of said compartment and down the central passage or flue 12, and out through the stack.

When it becomes necessary to reverse the direction of the currents of gas or air through the valve, the operation is as follows: Lever 39 is pushed to position indicated by A, Fig. I, and held in that position for a few seconds. Lever 39 has moved bar 34 forward, and the shoulders 35 and 36 of bar 34, against which bear the upper ends of valve-levers 35 and 37, will then move to the right, allowing the valve-levers 26 and 28 to rotate around their fulcrums 30 and 32 and to close the seats of the auxiliary valves 18 and 20, thereby permitting the compartments 14 and 16 to fill up with water until they are sealed from each other or with the gas or air inlet or vertical passages in the valve, thus preventing any danger of back flashes or the escape of gas to the chimney-flue.

The operator, when the compartments 14 and 16 are filled with liquid, (which takes but a short period of time,) pushes the upper end of lever 39 over until it reaches the position indicated at B in Fig. I. During the operation the lever is drawing bar 34 toward the gas-inlet end of the valve. Shoulders 36 and 38 are brought into contact with the upper ends of valve-levers 27 and 29, raising said levers upon their fulcrums 31 and 33, unsealing the seats of auxiliary valves 19 and 21, and emptying the compartments 15 and 17 to the approximate level of the auxiliary valves, sealing flanges 45 45. When the valve-compartments are in the above-described condition, (see Fig. VII,) the gas or air from inlet 2 will pass down and between the end walls of the casing 1 and the side of flange 7 into compartment 17 and around flange 7 down and out of vertical passage 13 to the furnace. The waste gases will pass up vertical passage 11, turn down into compartment 15 and around flange 5, up and out of said compartment, and down flue 12 and out of the stack.

At each reversal of the valve by admitting a flushing flow of water the sealing-chamber may be thoroughly washed out, thus preventing accumulations which, if allowed to collect, might seriously interfere with the successful operation of the mechanism.

In Fig. V the main gas-inlet is shown through the bottom of the valve; otherwise the operation and construction are similar to those already described, except that the water flows into chamber 14 on the side only.

It will be seen by the general arrangement, as shown and described, that the gaseous currents are easily controlled and directed alternately by means of operating the lever, which when pushed to either of the three positions indicated changes the relative courses of the gas or prevents it from passing through the valve.

Having described my invention, I claim—

1. In a reversing-valve, the combination of a valve-casing: a valve-seat arranged therein having water-compartments, suitable air, gas and stack ports located intermediately of said water-compartments; a valve-body having flanges projecting into said water-compartments and means for changing the level of the water in any of said compartments at will.

2. In a reversing-valve, the combination of a valve-casing; a valve-seat arranged therein having water-compartments; suitable ports located intermediately of said compartments; a valve-body having projections registering with said compartments, and means for changing the level of the water in any of said compartments at will.

3. In a reversing-valve, the combination of a valve-casing; a valve-seat arranged therein having water-compartments and a trough extending around the periphery of said valve-seat communicating with said compartments; a valve-casing supported in said trough; suitable ports located intermediately of said compartments; a valve-body having projections registering with said compartments and means for changing the level of the water in any of said compartments at will.

4. In a reversing-valve, the combination of a valve-casing; a valve-seat arranged therein having water-compartments; suitable ports located intermediately of said compartments; a valve-body having projections registering with said compartments; means for introducing water into said compartments and outlet-valves for said compartments, whereby the level of water therein can be regulated at pleasure.

5. In a reversing-valve, the combination of a valve-casing; a valve-seat arranged therein

having water-compartments and a trough extending around the periphery of said valve-seat communicating with said compartments; a water-inlet and a water-outlet to said trough; discharge-valves for said compartments whereby the level of water therein can be regulated at pleasure; suitable ports located intermediately of said compartments and a valve-body having projections registering with said compartments.

Signed at Pittsburg this 11th day of June, 1901.

SAMUEL FORTER.

Witnesses:
GEO. H. HARVEY,
LUCY DORSEY IAMS.