

(No Model.)

2 Sheets—Sheet 1.

F. V. MATTON.
FOUR WAY REVERSE VALVE.

No. 588,458.

Patented Aug. 17, 1897.

FIG. 2.

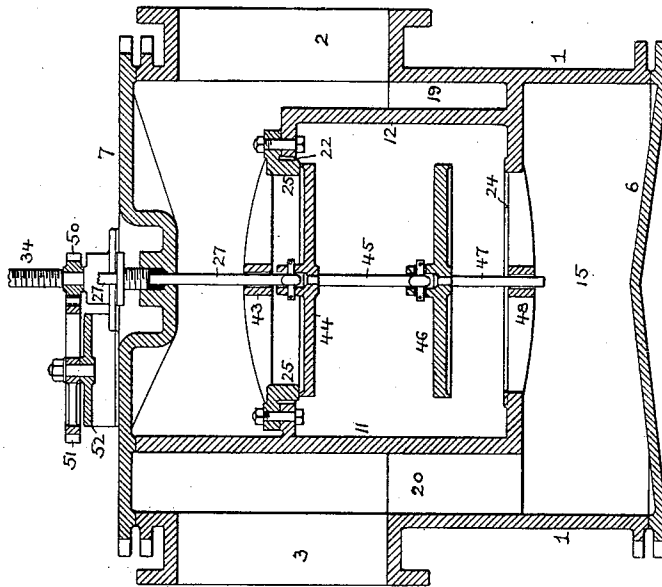
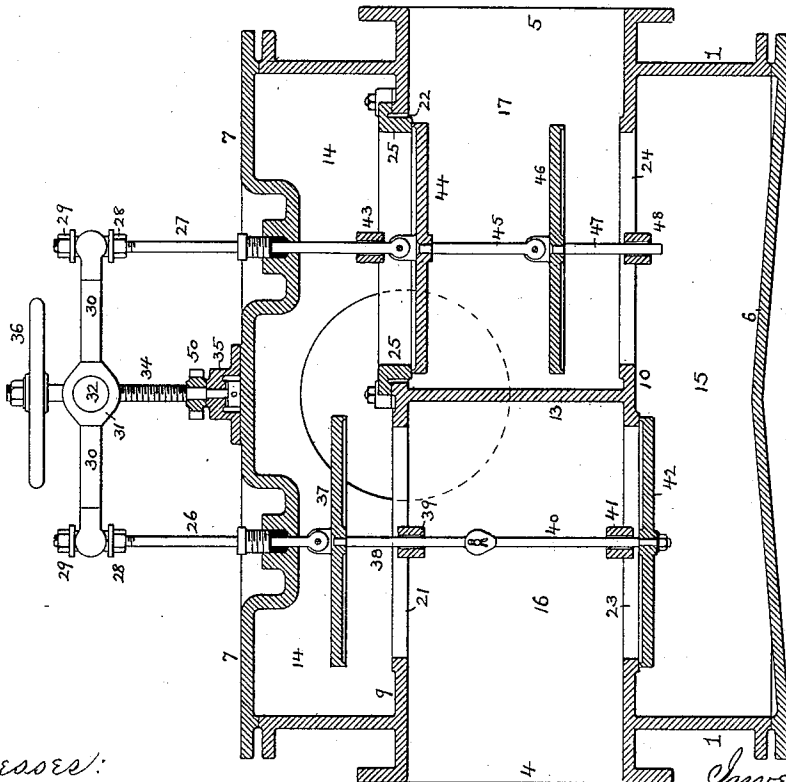


FIG. 1.



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Hamilton D. Turner

Inventor:
Frederick V. Matton
by his Attorneys
Hewson & Hewson

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FIG. 3.

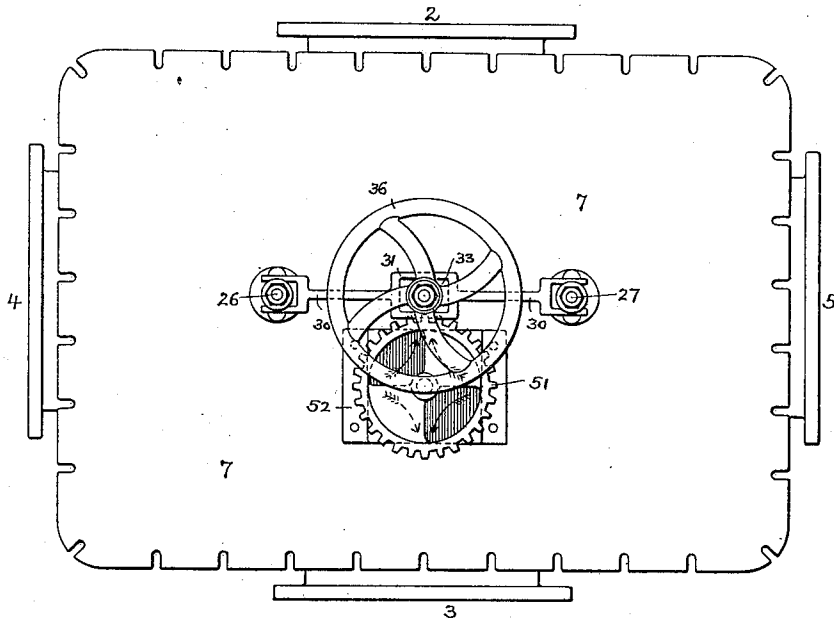


FIG. 5.

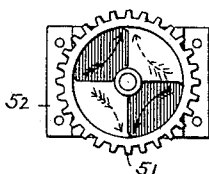


FIG. 6.

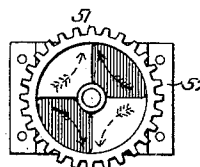
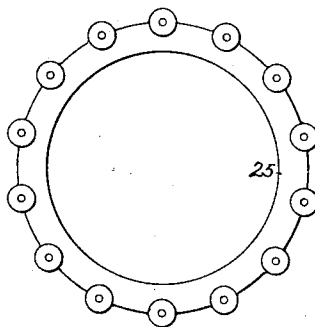


FIG. 4.



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UNITED STATES PATENT OFFICE.

FREDERICK V. MATTON, OF CAMDEN, NEW JERSEY, ASSIGNOR TO THE
CAMDEN IRON WORKS, OF SAME PLACE.

FOUR-WAY REVERSE-VALVE.

SPECIFICATION forming part of Letters Patent No. 588,458, dated August 17, 1897.

Application filed April 30, 1897. Serial No. 634,603. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK V. MATTON, a subject of the King of Sweden and Norway, and a resident of Camden, Camden county, New Jersey, have invented certain Improvements in Four-Way Reverse-Valves, of which the following is a specification.

The objects of my invention are to construct a simple and effective form of four-way reverse-valve which can be readily operated, will provide passages of large area for the flow of fluid, and will indicate in which direction the fluid is flowing through the same. These objects I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal sectional view of a four-way reverse-valve constructed in accordance with my invention. Fig. 2 is a transverse section of part of the same. Fig. 3 is a top or plan view. Fig. 4 is a top or plan view of the valve-seat, and Figs. 5 and 6 are views illustrating in different positions the index or indicator which shows the direction of flow of fluid through the valve.

The casing 1 of the valve has branches 2 at opposite sides and branches 4-5 at opposite ends, the bottom of the casing being closed by a base-plate 6 and the top of the casing by a cap-plate 7, and the interior of the valve-casing is divided by means of horizontal partitions 9 and 10, vertical longitudinal partitions 11 and 12, and a vertical transverse partition 13 into an upper chamber 14, a lower chamber 15, intermediate chambers 16 and 17, and side chambers 19 and 20, as clearly represented in Figs. 1 and 2 of the drawings.

An opening 21 is formed in the horizontal partition 9 on one side of the transverse partition 13 therein, and on the opposite side of said partition 13 the partition 9 has another opening 22 formed in it, and in like manner openings 23 and 24 are formed in the horizontal partition 10 on opposite sides of the central partition 13, the opening 22 being somewhat larger in diameter than the opening 24 in order that it may receive an annular valve-seat 25, which is secured to the partition 9 in any available manner.

Through suitable stuffing-boxes in the top

or cap plate 7 of the valve-casing pass valve-stems 26 and 27, and at the outer end of each of said valve-stems are nuts 28 and 29, which bear upon the upper and lower sides of one of the forked arms of a lever 30, which is centrally expanded so as to form a box or cage 31, having bearings for the trunnions 32 of a nut 33, to which is adapted a screw-stem 34, mounted in a bearing 35 on the top plate 7, so that it is free to turn, but can have no vertical movement, the upper end of the screw-stem 34 having an operating wheel or handle 36, whereby it may be readily manipulated.

To the inner end of the valve-stem 26 is pivoted a valve 37, which plays in the upper chamber 14 of the valve-casing and is adapted by a downward movement to close the opening 21 in the horizontal partition 9, said valve 37 having a depending stem 38, which passes through an opening in a guide-rib 39, crossing the opening 21, and is pivoted at its lower end to the upper end of the stem 40, which passes through an opening in a guide-rib 41, crossing the opening 23 and carrying at its lower end a valve 42, which plays in the lower chamber 15 of the valve-casing and is adapted to close the opening 23 by an upward movement.

The valve-stem 27 passes through an opening in a guide-rib 43, crossing the annular valve-seat 25, and to the inner end of said valve-stem is pivoted a valve 44, which is adapted to play in the intermediate chamber 17 of the valve-casing and to close by an upward movement the opening in the valve-seat 25, and from this valve 44 depends a stem 45, to the lower end of which is pivoted a valve 46, having a depending stem 47, which passes through an opening in a guide-rib 48, crossing the opening 24 in the lower partition 10, said valve 46 also playing in the intermediate chamber 17 of the valve-casing and being adapted to close the opening 24 by a downward movement.

Secured to the screw-stem 34 is a spur-pinion 50, which meshes with a spur-wheel 51, the latter turning on a short spindle carried by a plate 52, and on the upper face of this plate are formed two pairs of converging arrows, as shown in Figs. 5 and 6, the pair of

arrows on one side of the axis of the wheel 51 curving to the right and the pair on the other side of the axis of said wheel curving to the left.

5 The wheel 51 has two wide spokes separated by two wide spaces which bear such relation to the arrows marked upon the upper face of the plate 52 that when one arrow of each pair is exposed through the spaces in the wheel 51 the other arrow of each pair will be hidden from view by the spokes of the wheel.

10 When the valve is adjusted to the position shown in Figs. 1, 2, and 3—that is to say, when the valves 42 and 44 are closed and the valves 37 and 46 are open—fluid entering the valve-chest through the branch 5 will pass from the intermediate chamber 17 into the lower chamber 15, thence through the side chamber 20 to the branch 3, which may be connected to a pipe leading to the purifier or other apparatus. On its return the fluid enters the chamber 16 through the branch 4, passes thence into the upper chamber 14 and out through the side branch 2, or with the parts in the position shown the flow may, if desired, be the direct reverse of this.

25 When the position of the valves is changed—that is to say, when the valves 37 and 46 are closed and the valves 42 and 44 are opened—fluid entering the branch 5 passes from the intermediate chamber 17 into the upper chamber 14 and thence out through the branch 2, and returning through the branch 4 passes from the intermediate chamber 16 into the lower chamber 15, and thence through the side chamber 20 to the branch 3, or the flow in this case also may be in precisely the reverse direction.

40 Owing to the pivotal connection of the valves with each other and with the operating valve-stems, the seating of one valve is not affected by that of the other valve of the pair, and by reason of the lever connection between the operating screw-stem 34 and the valve-stems 26 and 27 any defect which might otherwise arise from a valve of one stem coming in contact with its seat before a valve of the other stem is effectually obviated, while the external index or indicator shows clearly to the operator the direction in which the fluid is traveling in the valve-chest, it being understood that the number of teeth in the pinion 50 is so proportioned in respect to the number of teeth in the spur-wheel 51 that when either pair of valves is seated the spur-wheel occupies a position which exposes the proper arrows to indicate the direction of flow effected by such adjustment of the valves.

60 It will be evident that a reverse construction of indicator may be adopted without departing from my invention—that is to say, the arrows may be formed upon the spur-wheel and the blanks may form part of and the spaces may be formed in a shield-plate for said spur-wheel.

The use of the detachable valve-seat 25 is

rendered necessary by the fact that the valves 44 and 46 must be passed through the opening in the horizontal partition 9 in order to assume their proper position in the intermediate chamber 17. 70

The use of the side chamber 19 is not essential, nor would the side chamber 20 be required if it were not for the advisability of locating the branches 2 and 3 in line with each other, since it is manifest that said chamber 20 could be abandoned if the branch 3 communicated directly with the lower chamber 15 of the chest. 75 80

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

1. A four-way reversing-valve comprising a casing or chest with side and end branches 85 and longitudinal and transverse partitions dividing said chest into intermediate chambers communicating respectively with the end branches of the chest, and upper and lower chambers communicating respectively with the side branches of the chest, each intermediate chamber having means of communication with both the upper and lower chambers, and two pairs of valves, one pair governing the communications of one intermediate 95 chamber and the other pair governing the communications of the other intermediate chamber, each pair of valves being connected to a reciprocating valve-stem so that one valve of the pair closes as the other opens, the controlling-valves of one intermediate chamber being contained within the same and those of the other intermediate chamber being contained respectively in the upper and lower chambers of the valve-casing, substantially 105 as specified.

2. A four-way reversing-valve comprising a casing or chest with side and end branches and longitudinal and transverse partitions dividing said chest into intermediate chambers communicating respectively with the end branches of the chest, and upper and lower chambers communicating respectively with the side branches of the chest, each intermediate chamber having means of communication with both the upper and lower chambers, and two pairs of valves, one pair governing the communications of one intermediate chamber and the other pair governing the communications of the other intermediate chamber, 110 each pair of valves being connected to a reciprocating valve-stem, and said valve-stems engaging the opposite arms of a lever pivoted to a nut which engages with an operating screw-stem mounted upon the valve-casing, 115 substantially as specified. 120 125

3. The combination of a valve-casing having openings therein adapted to be opened and closed by the movement of oppositely-facing valves actuated by a single stem, said valves being pivotally connected to each other and to the operating-stem, substantially as specified. 130

4. The combination of a valve-chest hav-

ing openings to be closed by the movement of oppositely-facing valves actuated by the same stem, one of said openings being of greater diameter than the valve and having a detach-
5 able valve-seat of less diameter than the valve in order to provide for the passage of both of the valves through the opening in adjusting them to their proper position, substantially as specified.

10 5. The combination of a four-way reversing-valve, an operating-stem therefor, a spur-wheel geared to said stem, an index-plate having thereon two pairs of converging arrows, one pair curving to the right and the other

pair curving to the left, and a shield with al- 15 ternating blanks and spaces whereby movement of the spur-wheel is caused to uncover one arrow of each pair and simultaneously cover the other arrow of each pair, substantially as specified. 20

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

FRED. V. MATTON.

Witnesses:

WILL. A. BARR,
JOS. H. KLEIN.