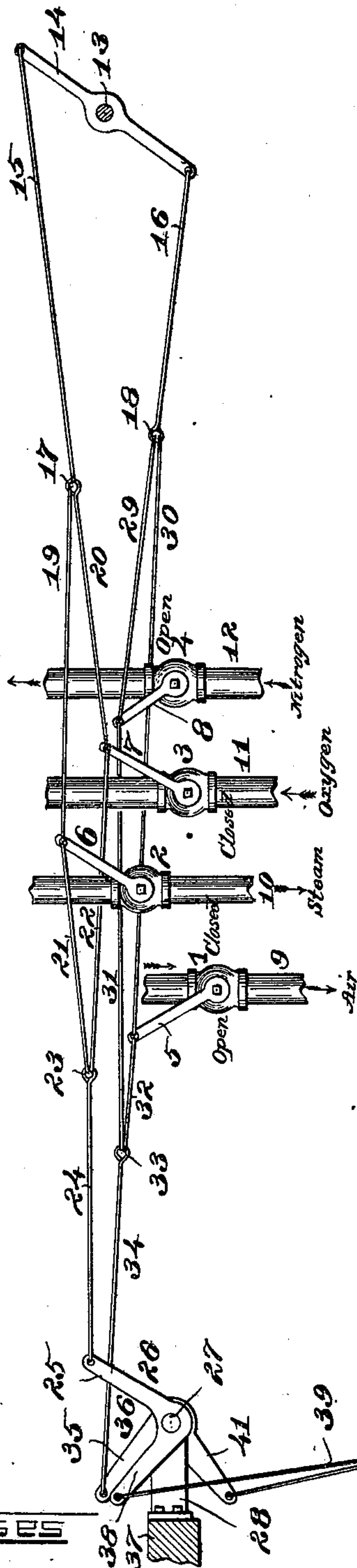


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Patented May 28, 1901.

C. E. FELT.
VALVE SHIFTING DEVICE.
(Application filed Oct. 15, 1900.)

(No Model.)



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VALVE-SHIFTING DEVICE.

SPECIFICATION forming part of Letters Patent No. 675,327, dated May 28, 1901.

Application filed October 15, 1900. Serial No. 33,063. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. FELT, a citizen of the United States, residing in the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Valve-Shifting Devices, of which the following is a specification.

My invention relates to valve-shifting devices in which a number of valves are connected by rods, bars, or other means and simultaneously shifted in the same direction by means of a lever or other device, and this although said valves, so far as location is concerned, are in position for separate hand manipulation.

The primary object of this invention is to simultaneously shift valves which owing to their location and other conditions—such, for example, as extreme temperature—are practically inaccessible for hand manipulation or even for simultaneous shifting by the usual shifting devices in ordinary proximity thereto.

Another object is to simultaneously shift in opposite directions, by means of a single lever, a number of valves, in pairs, located either alternately or adjacent to each other.

A still further object is to simultaneously shift a number of valves without regard to this relative arrangement to each other, but which are in differing horizontal and also vertical planes, and this by connections actuated by a single lever.

With these ends in view my invention consists in certain features of novelty in the construction, combination, and arrangement of parts by which the said objects and certain other objects hereinafter appearing are attained, all as fully described with reference to the accompanying drawing, and more particularly pointed out in the claims.

In the said drawing the single figure thereof illustrates in end elevation an arrangement of valves and of devices connecting and operating the same embodying my invention, and this particularly in connection with valves which in their employment, as hereinafter described, are practically inaccessible for hand manipulation or by means of lever and other connections within their immediate vicinity and valves in differing vertical and

horizontal planes and in pairs, one of which pairs is located between the other pair.

The reference-figures 1, 2, 3, and 4 indicate valves or stop-cocks, each of which is in a differing horizontal and vertical plane with reference to the others, which said valves or cocks are of the usual and ordinary construction, capable of being opened and closed by oscillating, said valves being each respectively provided with levers 5, 6, 7, and 8, by means of which they are operated to open and close the pipes 9, 10, 11, and 12 in which said valves are located. In the position in which the levers are shown the valves 1 and 4 are open and the intermediate pair of valves 2 and 3 are closed, and all of said valves for the purposes for which they were specially designed are immediately over and in quite close proximity to the top of a retort (not shown) for the production of oxygen from manganates or other materials of considerable height and maintained at very high temperatures—say, for example, in the neighborhood of and above 500° centigrade—and as a result of which said valves cannot be practically operated except from a considerable distance away from such retort, nor except from the ground or floor at a point ten or more feet below the valves.

In the production of oxygen from manganates the pipe 9 extends through the interior of the retort to the bottom thereof for supplying air for the oxidation of the manganate, while the pipe 12 enters and terminates at the upper end of the retort and forms the discharge from the retort of poor air, consisting mainly of nitrogen and a small volume of oxygen, while the pipe 10 also extends down to the retort to its bottom and constitutes a steam-passage through which steam, without being superheated, is conducted to the manganate for deoxidizing purposes, while the pipe 11 opens into the upper part of the retort, whence the oxygen rises and is discharged thence to a suitable holder for subsequent use.

In the manufacture of gases, and particularly oxygen gas from manganates, the steam-pipe 10 and the oxygen-discharge pipe 11 must be closed during the oxidation of the

manganate and at which time the pipes 9 and 12 should be opened, and vice versa, in the deoxidation of the manganate, and hence, owing to the necessary location of these valves quite close up to the top of the retorts, some means must be provided for the simultaneous closing and opening of such valves, arranged in pairs, as indicated, and this from a point removed from the very high temperatures before mentioned and conveniently accessible for the attendant. To these ends 13 indicates a fixed shaft, on which, at its center of length, is pivoted a bar 14. The operation of said bar, however, would be the same if it were fixed on the shaft and the shaft pivoted. Pivotally secured at each end of the bar 14 are rods 15 16, terminating at their opposite ends in eyes or loops or slots, as may be, 17 18, to the eye 17 of which are movably secured rods 19 20, the rod 19 of which is pivotally attached to the lever 6 of the valve 2 and the rod 20 to the lever 7 of the valve 3, and to these levers 6 and 7 and projecting from the opposite sides thereof are rods 21 and 22, one of which, 21, passes across the front side of the pipe 10 and the other, 22, across the rear side thereof, and both of said rods 21 and 22 being linked or coupled to the eye 23 in a rod 24, pivotally secured to the adjacent arm 25 of a bell-crank 26 on a shaft 27, supported by a bracket 28.

Linked to or pivoted in the eye 18 are two rods 29 and 30, the former of which, 29, passes in front of the pipe 12 and is linked to the arm 8 of the valve 4, to which arm 8 is also linked a rod 31, which passes back of the pipes 10 and 11, while the rod 30 passes back of the pipes 10, 11, and 12 to the front side of the pipe 9, where it is linked to the arm 5 of the valve 1, another and short rod 32 being likewise secured to said arm 5 and with the rod 31 linked to the eye 33 in a rod 34, pivoted to the arm 35 of a bell-crank 36 on the shaft 27 at the rear side of the bracket 28, which is secured to a stringer or beam or other support 37 in approximately the horizontal plane occupied by the several valves. Both crank-arms 26 and 36 are free to oscillate about the axis of the shaft 27, which shaft may be fixed or loose, but is preferably fixed for stability.

Linked to the end of an arm 38 of the crank-arm 26 is a rod 39, extending downwardly and secured to the hand-lever 40 within convenient reach and manipulation of an attendant standing on the floor and at a point not objectionally near to the heat of the retort, while to an arm 41 of the crank-arm 36 is linked a rod 42, having its lower end secured to a cable 43, passing around a sheave 44, mounted in a block 45, the other end of the cable being secured to the lever 40 at a point next the rod 39 and the lever 40 being pivoted to a block, stanchion, or other suitable support 46 by a casting 47 or eyebolt, as may be.

The passing of the connecting-rods at the back and front of the adjacent pipes is due to the unavoidable arrangement of the pipes

and their respective valves, but otherwise is not necessary to the operation of the rods, although an illustration of the adaptability of my device to the operation of the valves in tortuous arrangement of that character. When the valves are in the position shown—namely, valves 1 and 4 open and 2 and 3 closed—the several rods, the bar 14, the cranks 26 and 30, the lever 40, and the cable 43 are in the position shown in the drawing, and in practice when the oxidation of a manganate is complete the lever 40 is depressed, and as a result the pair of valves 2 3 and 1 4, through the several connections described, are actuated in opposite directions, thereby simultaneously closing the valves 1 4 and opening the valves 2 3, shutting off the supply of air, closing the discharge of nitrogen, and opening up the supply of steam, deoxidizing the manganate and also opening the passage to the holder for the discharge thereto of the oxygen, as fast as it is evolved in the retort by the decomposing action of the steam.

On depressing the lever 40, the several rod connections between said lever, the bell-cranks, and the bar 14 the result is that the upper end of the lever 14 is pulled forward by the action of the bell-crank 25 and that the lower end of the lever 14 pulls its rod connections and valves in opposite direction and precisely the same distance, all of which is provided for by the movement in opposite directions of the rods 39 and 42 by reason of the connection of the rod 39 and the cable 43 with the lever and the connection of the rod 42 with the other end of the cable and without connection with the lever 40 and as could only accrue by the use of a flexible connection of this or a similar character cooperating with a sheave at the point at which the sheave 44 is located relatively to the lever 40 or without the employment of substantially different devices and more complicated devices between the bell-cranks and the lever.

It is obvious that the cable 43 may be extended to the arm 41 and the rod 42 be omitted, for obviously the depressing of the lever and of the arm 38 of the bell-crank through the pull of the rod 39 will result in the pull of the connections between the arm 25 and the upper end of the bar 14, cause the lower end of the arm 14 to exert a pull on the crank-arm 35, and lift and cause the arm 41 to lift the cable as fast as the rod 39 descends, and that when the lever 40 is lifted it will pull with it the attached cable, thereby drawing down the arm 38, thereby drawing down the arm 41, and through its connections pull the lower end of the bar 14 forward, while at the same time the upper end of the bar will by pull actuate its connections. In other words, the simultaneous operation of the valves will be the same by the omission of the rod 42 and the substitution of the cable therefor.

Having described my invention, what I desire to secure by Letters Patent is—

1. The combination, with a number of valves,

of a pivoted bar at one side thereof, a shaft upon which said bar is mounted, rods connecting said bar with each of said valves, and means for actuating said pivoted bar for shifting some of said valves simultaneously in opposite directions, whereby some of said valves are seated and others unseated, substantially as described.

2. The combination with a number of valves arranged in differing planes, either horizontally or vertically, or both, of a pivoted bar located at one side thereof, means for supporting said bar, rod connections between each of said valves and said pivoted bar, and means for oscillating said bar, whereby a number of said rod connections are shifted in one direction simultaneously with the shifting of the remaining number in the opposite direction, substantially as described.

3. The combination with a number of valves arranged in alternate pairs, of a pivoted bar and means for supporting the same, a number of rods independently connecting each pair of valves with said bar, and means for actuating the pivoted bar, whereby said valves are simultaneously seated and unseated, in pairs, substantially as described.

4. The combination of a number of valves, a pivoted bar arranged at one side thereof, a bell crank or cranks arranged at the opposite side thereof, rods connecting said bell crank or cranks with the valves, in pairs, and with the pivoted bar, and means for actuating said bell-cranks simultaneously in opposite directions and with them the valves and the bar, substantially as described.

5. The combination with a number of valves, a pivoted bar at the one side thereof, bell-cranks at the opposite side, means for connecting said valves in pairs and with the bar

and bell-cranks of a hand-lever pivoted at one side of the bell-cranks, a cable and rod connection independently secured to the lever, and a sheave sustaining said cable connection, substantially as described.

6. The combination of a number of valves arranged in differing planes and in pairs, with a pivoted lever at one side thereof and a pair of pivoted bell-cranks at the opposite side, a rod connection between one or more pairs of said valves and with one of said bell-cranks and end of said pivoted bar, and a rod connection between the other pair or pairs of said valves and the other bell-crank and end of said pivoted bar, and means for simultaneously actuating said bell-cranks in opposite directions and with them the bar and the separate pairs of valves, substantially as described.

7. The combination of a number of valves arranged in differing planes and in pairs, with a pivoted lever at one side thereof and a pair of pivoted bell-cranks at the opposite side, a rod connection between one or more pairs of said valves and with one of said bell-cranks and end of said pivoted bar, and a rod connection between the other pair or pairs of said valves and the other bell-crank and end of said pivoted bar, a lever, of the first class, arranged below said bell-cranks, a sheave below said lever, a rod connection between said lever and one of said bell-cranks, and a flexible connection between said lever, the other bell-crank and the shaft, substantially as described.

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Witnesses:

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