No. 723,801. PATENTED MAR. 24, 1903.

O. N. RAUSCHENBERG.

GAS REVERSING VALVE.

APPLICATION FILED JAN. 15, 1903.

NO MODEL.

Fig. 1

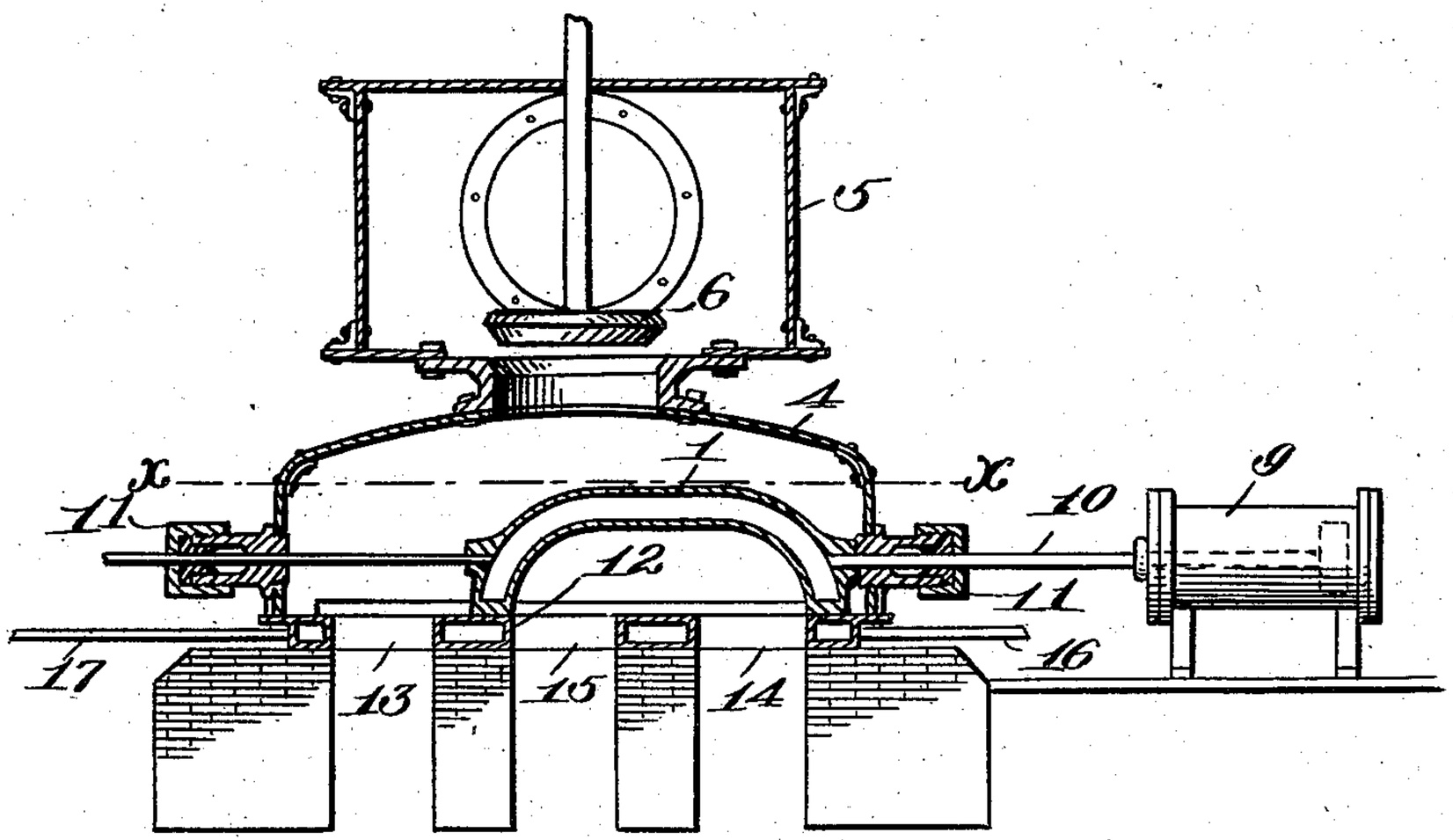


Fig. 2.

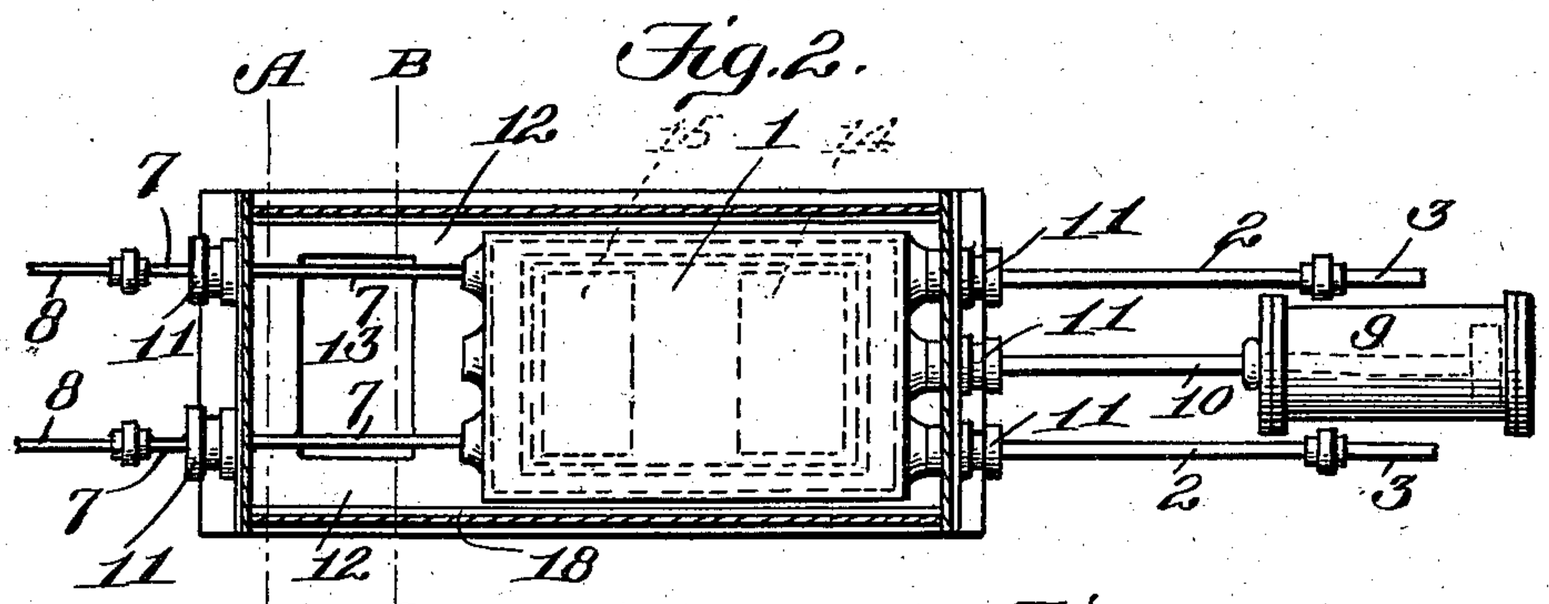


Fig. 3.

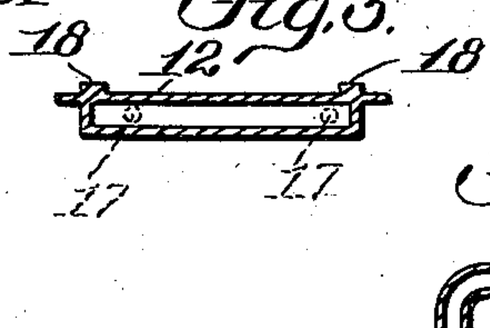


Fig. 4.

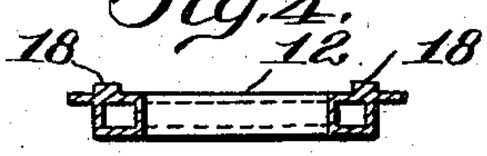
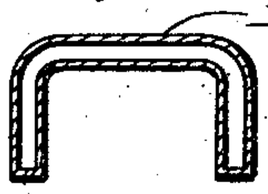


Fig. 5



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UNITED STATES PATENT OFFICE.

OWEN N. RAUSCHENBERG, OF BIRMINGHAM, ALABAMA.

GAS-REVERSING VALVE.

SPECIFICATION forming part of Letters Patent No. 723,801, dated March 24, 1903.

Application filed January 15, 1903. Serial No. 139,126. (No model.)

To all whom it may concern:

Be it known that I, OWEN N. RAUSCHENBERG, a citizen of the United States, residing at Birmingham, in the county of Jefferson and State of Alabama, have invented certain new and useful Improvements in Gas-Reversing Valves, of which the following is a specification.

My invention relates to an improved sliding valve and its seat for reversing the flow of gas in regenerative and similar furnaces. Its object is to provide means whereby these parts may be maintained at such temperatures as will prevent the excessive heat to which they are subjected warping or burning them, and thus so materially interfering with the sliding movements of the valve upon and its contact with its valve-seat as to render such valves impracticable. To obviate these difficulties and provide against warping and burning, these valves have heretofore been lined with refractory material and have also been constructed in the form of a dome-shaped casing with a water-space between its walls which is filled through an opening in its top by stationary water-pipes and designed to overflow and keep the casing cool. The action of these means was not successful in overcoming the effects of the heat upon the metal, and in practice it was necessary when shifting the valve to reverse the gas to lift it from the seat on rocking-lever arms. The disadvantages attending such an action of the valve are obvious, for not only does it open the flues directly to the chimney when lifted from the seat, but in seating the gas was reversed so suddenly that the furnace was subjected to great strain. Further, the locating of the pivot-pins for these valves requires great accuracy and when burned off, as is often the case when the valve is supported in its open position for the purpose of utilizing the gas to burn out the chimney, operators are put to considerable delay and expense before they can be replaced properly. For a successful operation of the valve, therefore, it should slide over the three-way seat and be so constructed that it will be always and fully protected from the action of the heat in whatever position it may be. When such is the case and a similar protection is provided for the seat, the valve will always slide freely thereon and its contact will be close enough to insure against leakage, and, further, by reason of its sliding motion over the flue-ports the reversal of the gas will be gradual. To effect these ends, I provide the valve and its seat with enlarged water-circulation chambers through which water under pressure is forced by a plurality of pipes flexibly connected with any suitable source of supply, so that they readily shift with the valve.

To enable others skilled in the art to make and use my invention, I will now describe it more fully, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal sectional elevation of the valve and its seat, showing them suitably mounted and directing the gas to one of the furnace-flues. Fig. 2 is a plan view taken along the line $x\,x$, Fig. 1, looking down upon the valve and its seat. Fig. 3 is a transverse section of the valve-seat, taken along the line A A, Fig. 2; and Fig. 4 is a similar transverse view taken along the line B B. Fig. 5 is a transverse sectional view of the valve, showing the continuous water-passage between its inner and outer walls.

The dome-shaped valve-casing 1 is preferably cast integral and cored to form a continuous and uninterrupted space between its inner and outer walls for the circulation of water therethrough. The pipes 2, connected by flexible hose 3 with any suitable source for supplying water under pressure, enter either side of one end of the valve and keep the circulation-chamber filled at all times. The valve is mounted within the casing 4, to which gas is supplied in the usual manner from the gas-box 5 under the control of a regulating-valve 6. Outlet-pipes 7 for the water circulation through the valve are placed at its other end opposite to the inlet-pipes 2 and have flexible pipes 8 to conduct the water to the waste or a reservoir when desired for further use. To increase the pressure of the water in the valve and maintain its circulation-chamber always full, I make the inlet-pipes 2 larger in diameter than the outlet-pipes 7, whereby more water is always being forced into the circulation-chamber than can be readily carried off by the pipes 7. Such

an arrangement is particularly necessary when the chamber is curved in cross-section, for otherwise if the water is allowed to escape as freely as it enters there will be danger of it flowing along the sides of the valve and exposing the top portion and causing it to warp or burn. If, however, the eduction-pipes be of a reduced capacity, the induction-pipes will supply sufficient water to protect the valve fully at all points.

To operate the valve, I provide as a preferable means a steam-cylinder 9, whose piston 10 connects to one end between the pipes 2; but obviously any other well-known device for shifting the valve may be substituted therefor. Suitable stuffing-boxes 11 are provided for the water-pipes 2 and 7 and for the piston 10 to prevent leakage of the gas from the casing 4, through which they pass.

It is equally important that the valve-seat be protected against warping and burning; otherwise the action of the valve would be interfered with and its joints would permit the gas to leak. To provide against this, the integral casing is cored to form a circulation-chamber, interrupted only by the ports 13 and 15, leading to the furnace, and port 14, leading to the stack. These ports are centrally disposed. Hence an uninterrupted flow of water may pass along the sides of the seat from the two inlet-pipes 16 to the two oppositely-arranged outlet-pipes 17, disposed at the other end of the seat. As in the case of the valve, the inlet-pipes 16 are larger in diameter than the outlet-pipes, and water is supplied to said seat from any suitable source under pressure. The seat 12 has integral flanges 18, which serve as guides for the valve in its movements, the same being held in place and in close contact with the seat by reason of its great weight.

From the operation of this valve it is evident that as it slides it gradually cuts off the gas from one flue as it directs more and more of it into the other, thus reversing the gas slowly and preventing any injury to the furnace. At the same time the valve is of such a length that it can be made to straddle both ports, and thus permit the chimney-flue to be burned out and freed from accumulations of soot. My valve is fully protected from the heat while in this position for burning out the chimney, whereas the butterfly, rocking, and water-seal valves are entirely unprotected and suffer accordingly.

By providing both the valve and its seat with a rapid circulation of water under pressure they will never become injuriously heated, and by this means every advantage gained by a successful sliding valve is secured.

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

1. In a gas-reversing valve, the combination of a valve-casing and a three-way seat therefor, both provided with enlarged water-circulation chambers, induction and eduction means for circulating water under pressure through said chambers, said induction means being of a greater capacity than the eduction means, substantially as described.

2. In a gas-reversing valve, the combination of a valve-casing and a three-way seat therefor, both provided with enlarged water-circulation chambers, pipes for circulating water under pressure through said chambers, the induction-pipes being greater in diameter than the eduction-pipes whereby the chambers are always maintained full, and means to slide said valve over its seat to reverse the flow of gas, substantially as described.

3. In a gas-reversing valve, the combination of a dome-shaped valve shell or casing provided with a continuous water-circulation chamber, a three-way seat provided with an enlarged water-circulation chamber, pipes for circulating water directly through said chambers, and means whereby the valve is maintained in sliding connection with said seat and operated to reverse the flow of gas, substantially as described.

4. In a gas-reversing valve, the combination of a sliding valve and a three-way seat therefor, said valve comprising an integral dome-shaped casing cored to form a continuous and uninterrupted passage for the circulation of water between its inner and outer walls, and a plurality of induction and eduction pipes entering either end thereof to circulate water under pressure directly therethrough, and said valve-seat having a water-circulation chamber and means for passing water therethrough under pressure, and flanges upon said seat to guide the valve in its sliding movements, substantially as described.

5. A gas-reversing valve comprising a sliding valve and a seat therefor, flanged projections on said seat serving as guides for said valve which is an integral dome-shaped casing cored to form a continuous and uninterrupted passage for the circulation of water, said valve-seat being cored out around the induction-ports and having induction and eduction pipes, so arranged that they cause direct circulation of water through the seat on either side of said ports, and pipes for passing a direct circulation of water under pressure through the valve, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

OWEN N. RAUSCHENBERG.

Witnesses:
R. D. JOHNSTON,
R. D. JOHNSTON, Jr.