No. 634,907. Patented Oct. 17, 1899.

H. T. NEWELL.

REVERSING VALVE FOR REGENERATIVE FURNACES.

(Application filed July 16, 1898.)

(No Model.)

Fig. 1.

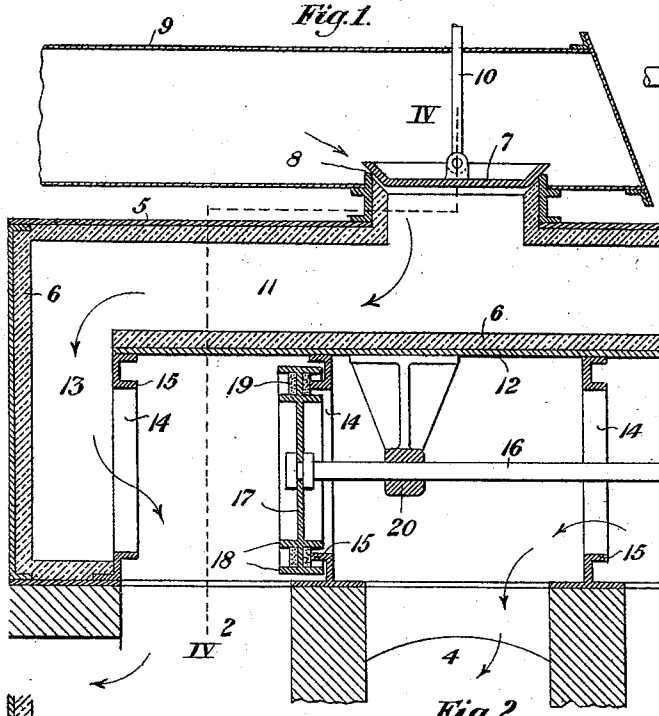


Fig. 3.

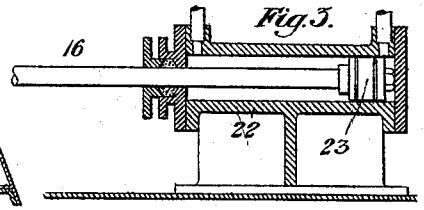


Fig. 2.

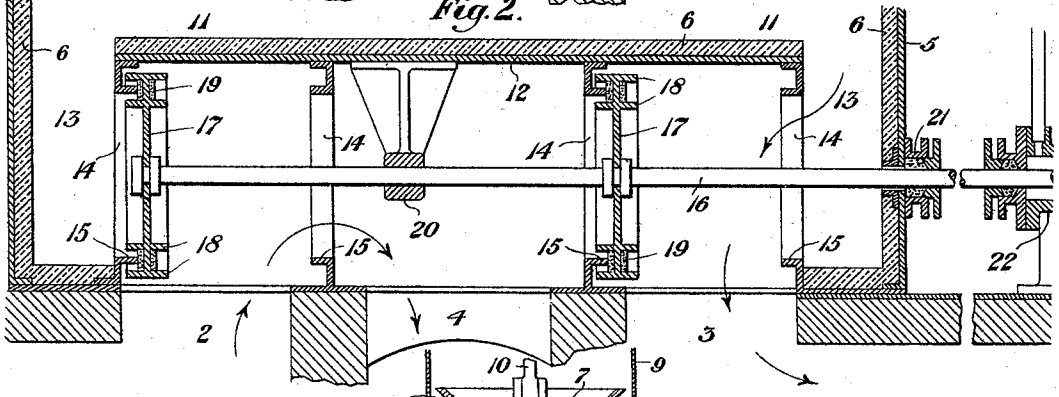


Fig. 6.

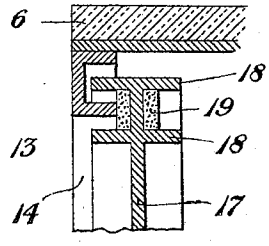


Fig. 4.

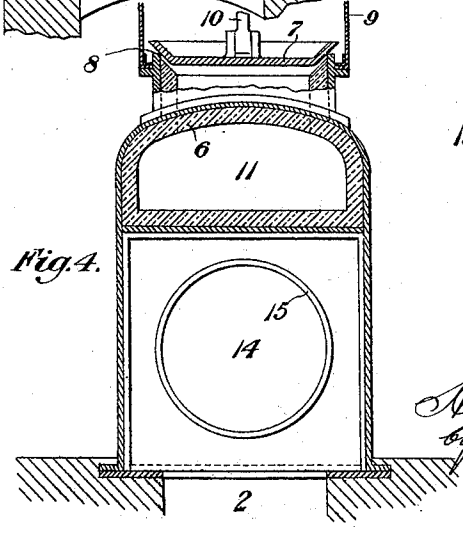
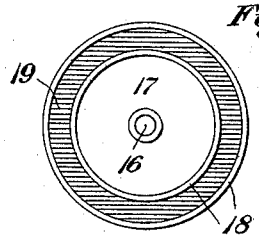


Fig. 5.



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UNITED STATES PATENT OFFICE.

HUGH T. NEWELL, OF PITTSBURG, PENNSYLVANIA.

REVERSING-VALVE FOR REGENERATIVE FURNACES.

SPECIFICATION forming part of Letters Patent No. 634,907, dated October 17, 1899.

Application filed July 16, 1898. Serial No. 686,175. (No model.)

To all whom it may concern:

Be it known that I, HUGH T. NEWELL, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented or discovered a new and useful Improvement in Reversing-Valves for Regenerative Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a central vertical longitudinal section throughout my valve, showing the valve set for circulation of the gases in one direction. Fig. 2 is a similar partial view showing it set for circulation in the opposite direction. Fig. 3 is a detail sectional view of the operating-cylinder. Fig. 4 is a cross-section taken on the line IV IV of Fig. 1. Fig. 5 is a face view of one of the mushroom-valves. Fig. 6 is a detail sectional view illustrating the asbestos packing.

My invention relates to the class of reversing-valves for regenerative furnaces by which the currents and flow of the gases are controlled and is designed for the purpose of simplifying the construction and operation of such valves, while increasing their efficiency and avoiding their defects.

In valves employing pivoted gates of the butterfly type great accuracy and care are required in order to adjust the parts so as to insure a gas-tight joint, while the tendency to warpage under the effect of heat is liable to cause inequalities in the meeting faces. In the construction of my valve I have obviated these difficulties and insured effective action of the valve, while rendering its operation easy and under perfect control.

Referring now to the drawings, 2 3 are the gas-flues leading to and from the regenerative chambers of a furnace, and 4 the flue leading to the stack, the general arrangement of such flues conforming to the customary construction practiced by furnace-builders.

5 is the outer casing of the valve, made of sheet or cast metal and provided with a lining 6 of refractory material. The casing is provided at its upper central portion with a gas-cut-off valve 7, seated upon an annular seat 8, the valve and seat being surrounded by a gas-box 9, through which the gas is conveyed to the valve from any source of supply. This valve is provided with a supporting-rod 10, by which it is operated to open or close by raising or lowering from or to the seat. Lateral passages 11 11 within the casing are formed by the outer inclosing shell 5 and an inner transverse partition 12, terminating within each end of the casing and leaving downward passages 13. Extending across the casing at the ends of the partition 12, corresponding with the outer vertical sides of the ports 2 3, and also in positions intervening between the gas-flues 2 3 and the stack-flue 4, are circular ports 14, located in pairs, one pair for each gas-flue, and provided with annular flanges 15, projecting inwardly toward the flue. Mounted on a horizontal shaft 16 are mushroom-valves 17, adapted to be seated against either annular flange and to close the ports, as shown, the opposite ports being opened and permitting circulation of the gases, as indicated by the arrows.

The valves 17 have a central web and oppositely-projecting inner and outer annular flanges 18, between which is inclosed the packing 19 of asbestos or other suitable fireproof material. This packing is for the purpose of insuring a tight joint against the annular flanges 15, against which the valve is designed to be forced with considerable pressure.

The shaft 16 is supported in a bearing 20 and in a stuffing-box 21, within which it is capable of free longitudinal movement, and motion is transmitted to the shaft by means of a piston 23 in the double-acting hydraulic cylinder 22, mounted outside the valve-casing. Other means may be employed for operating the shaft—as, for instance, a rack and pinion or suitable levers—and I do not desire to be limited to the means shown and described. Other changes or variations may be made in the design, proportions, or arrangement of my valve without departing from my invention and within the scope of the claims, since I do not desire to be limited to the exact form illustrated, but to include such alterations as will suggest themselves to the skilled mechanic, and within the scope of my invention I desire to include all such different arrangements or locations of the valve with relation to the flues and gas-supply conduit as may be found necessary or desirable

in practical use, and it will be understood that the terms descriptive of the location of the parts is merely relative.

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

1. A gas-valve for regenerative furnaces provided with downwardly-opening ports leading to the gas-flues, an intermediate downwardly-opening port leading to the stack-flue, a horizontal valve-chamber provided with valve-seats arranged vertically at each side of the gas-flue ports, a valve-rod mounted therein provided with valves adapted to cover such valve-seats, and a common gas-inlet passage opening into both ends of the horizontal valve-chamber, substantially as set forth.

2. A gas-valve for regenerative furnaces provided with downwardly-opening ports leading to the gas-flues, an intermediate downwardly-opening port leading to the stack-flue, a horizontal valve-chamber provided with valve-seats arranged vertically at each side of the gas-flue ports, a valve-rod mounted therein provided with valves adapted to cover such valve-seats, a common gas-inlet passage opening into both ends of the horizontal chamber, and a gas-inlet valve opening into the gas-passage, substantially as set forth.

3. A gas-valve for regenerative furnaces provided with ports communicating with the gas-flues of the furnace, an intermediate port communicating with the stack-flue, a horizontal valve-chamber provided with valve-seats vertically arranged at each side of the gas-flue ports and provided with vertically-arranged annular faces against which the valves abut, a valve-rod mounted therein provided with valves adapted to cover such valve-seats, a common gas-inlet passage opening into both ends of the horizontal chamber, and a gas-inlet-controlling valve opening into the gas-passage, substantially as set forth.

4. In a gas-valve for regenerative furnaces, the combination with a series of downwardly-opening ports communicating with the furnace gas-flues and stack-flue: of a horizontal valve-chamber provided with laterally-opening ports provided with projecting flanges, communicating with such downwardly-opening ports, and a series of horizontally-mounted reciprocating valves provided with packing material, mounted on a common valve-rod, adapted to be seated upon the laterally-opening ports, and a common gas-inlet passage leading to the outer opposite lateral ports and having a gas-inlet-controlling valve, substantially as set forth.

5. In a valve of the class described, a horizontal valve-chamber provided with laterally-opening ports having projecting annular flanges, and a series of similarly-arranged valves secured to a common valve-rod, provided with inner and outer annular flanges adapted to embrace the port-ring flange, and with packing material inclosed between the flanges, substantially as set forth.

6. In combination with a furnace, gas-flues communicating therewith, a stack-flue, and a port intermediate of the gas-flues and communicating with the stack-flue: a gas-valve consisting of a longitudinal valve-chamber, ports therein communicating with the gas-flues and stack-flues respectively, valve-seats arranged transversely across the longitudinal valve-chamber on each side of the gas-flue ports and provided with projecting annular flanges, a surrounding chamber having a common gas-inlet passage opening into both ends of the longitudinal chamber, a gas-inlet-controlling valve opening into the gas-passage, movable valves having oppositely-projecting inner and outer annular flanges with intervening packing material arranged to seat upon the annular flanges of the transversely-arranged valve-seats, and a common longitudinal valve-stem upon which the movable valves are mounted, with means for operating such valve-stem and valves, substantially as set forth.

In testimony whereof I have hereunto set my hand.

HUGH T. NEWELL.

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