No. 685,316. Patented Oct. 29, 1901.

H. C. WILLIAMSON & G. POWELL.

VALVE FOR REGENERATIVE FURNACES.

(Application filed Aug. 8, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1

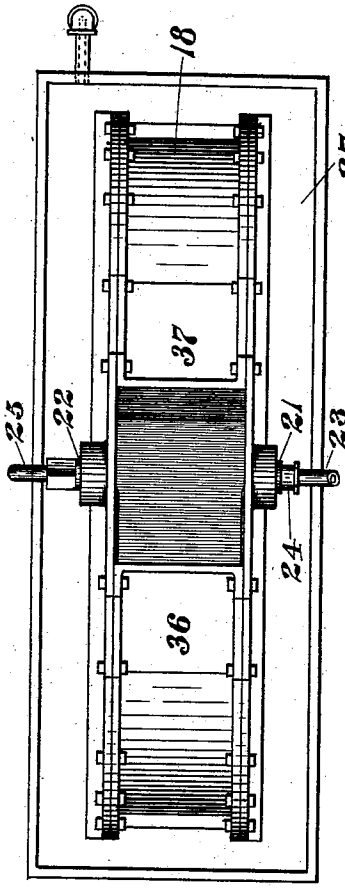


Fig. 2

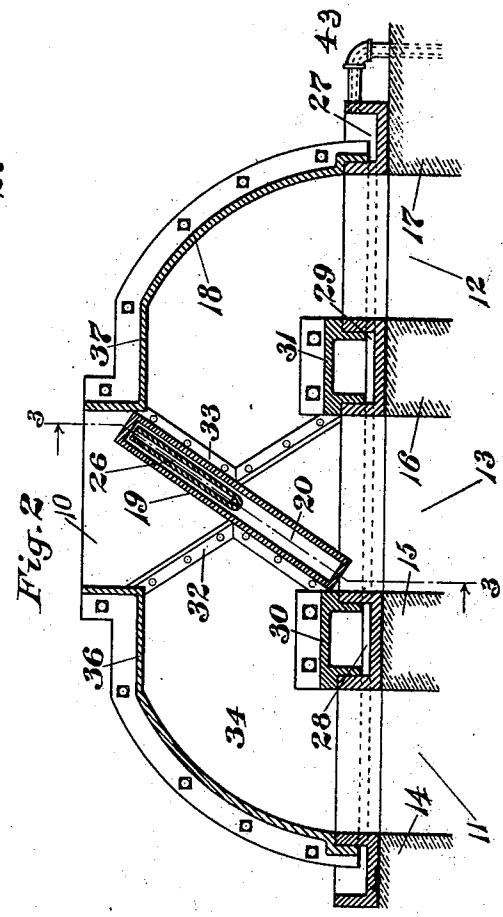
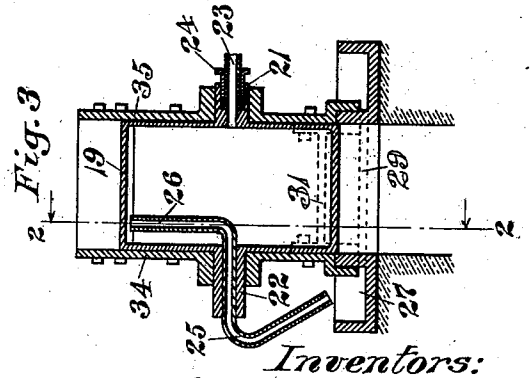


Fig. 3



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(No Model.) 2 Sheets—Sheet 2.

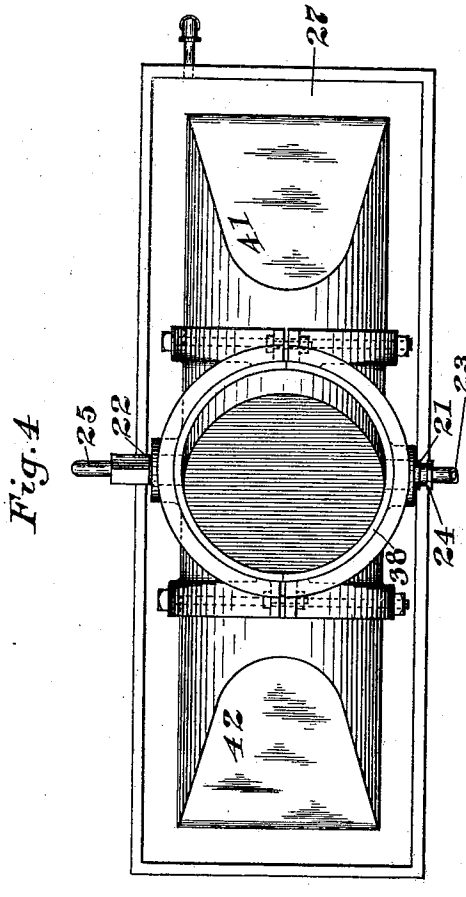


Fig. 4

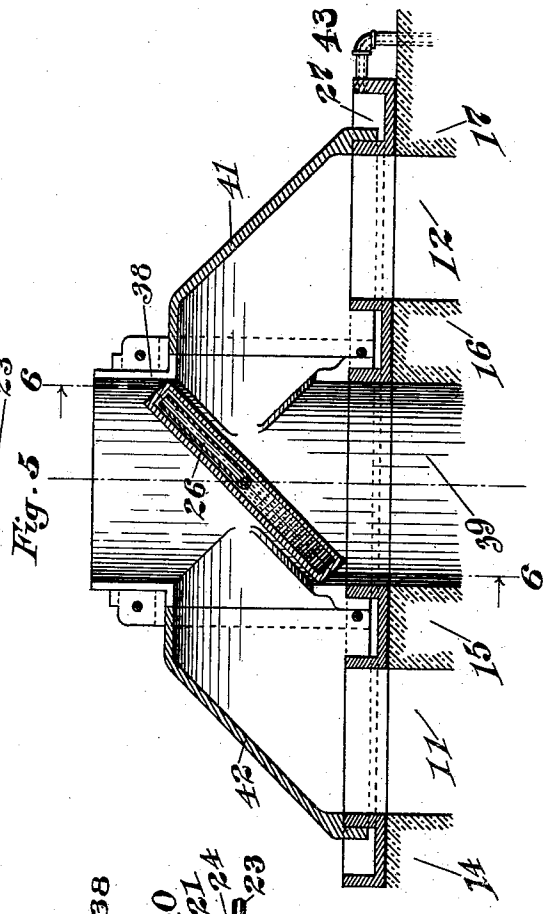


Fig. 5

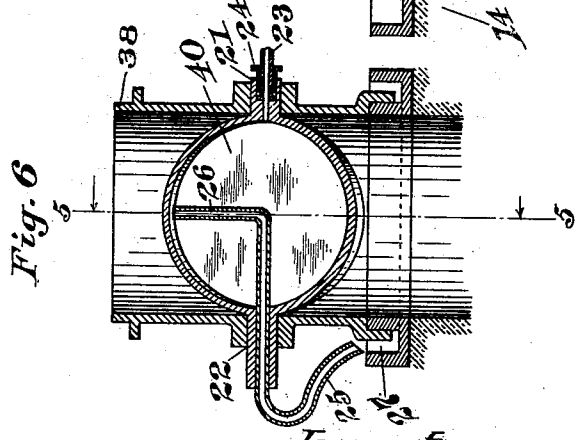


Fig. 6

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VALVE FOR REGENERATIVE FURNACES.

SPECIFICATION forming part of Letters Patent No. 685,316, dated October 29, 1901.

Application filed August 8, 1900. Serial No. 26,305. (No model.)

To all whom it may concern:

Be it known that we, HENRY C. WILLIAMSON and GOMERT POWELL, citizens of the United States, and residents of Michigan City, county of Laporte, and State of Indiana, have invented certain new and useful Improvements in Valves for Regenerative Furnaces, of which the following is a specification, and which are illustrated in the accompanying drawings, forming a part thereof.

This invention relates particularly to the reversing-valve and its casing for changing the direction of the gas or air currents. In furnaces of this type the gas and air supplies are led to the furnace through conduits which have been previously heated by the discharge therethrough of the flame issuing from the furnace, and from time to time the direction of the vapors passing through these conduits is reversed, so that the conduits may be alternately heated. Great difficulty has been found in providing a durable valve for effecting such reversal, as it is necessarily subjected to a high temperature and is therefore in great danger of being speedily burned out or so warped as to be useless. This danger is the greater when it becomes necessary, as it frequently does, to pass burning gases through all of the conduits for the purpose of cleaning them of soot and coal-tar.

The object of the present invention is to provide means for keeping the valve cool and for suitably seating the joints of the valve-casing; and these objects are attained in the construction hereinafter described, and which is illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the valve-casing. Fig. 2 is a vertical longitudinal section taken on the line 2 2 of Fig. 3. Fig. 3 is a transverse section on the line 3 3 of Fig. 2. Fig. 4 is a plan view of a modified form of valve-casing. Fig. 5 is a central longitudinal vertical section of the same, and Fig. 6 is a cross-section on the line 6 6 of Fig. 5.

The usual conduits or flue-passages are present, the conduit leading from the gas-producer being shown at 10, the conduits for connecting the valve-casing with the furnace being shown at 11 and 12, and the conduit leading from the valve-casing to the stack being shown at 13, the last-named conduit being central as to the casing, and hence between the conduits 11 and 12, and the first-named conduit 10 entering the valve-casing centrally through its top. The conduits 11, 12, and 13 are usually underground, and their walls 14, 15, 16, and 17 are of masonry.

The valve-casing 18 is of metal and in the construction of Figs. 1, 2, and 3 is substantially dome-shaped, except that it has flat sides 34 and 35 in parallel planes. The valve 19 is of the butterfly type and is pivoted transversely across the interior of the case and is of such length that it will reach from one side of the conduit 10 at its juncture with the interior of the valve-casing diagonally across the interior of the casing to the upper end of one of the conduit-walls 15 16, and the valve is free to oscillate back and forth across the throats of the conduits 10 and 13, so that the conduits 10 and 11 and 12 and 13 or 10 and 12 and 11 and 13 may alternately be brought into communication.

The valve 19 is chambered, as shown at 20, and is provided with trunnions 21 22, tubular in form and cast integral with the body of the valve, these trunnions being journaled in suitable apertures in the side walls 34 35 of the valve-casing. To one of the trunnions, as 21, there is secured a water-pipe 23, leading from any suitable supply of water and entering the bore of the trunnion through a suitable stuffing-box 24, so as to form a water-tight connection while permitting the relative angular movement of the pipe 23 and the trunnion.

A discharge-pipe 25 leads from the chamber 20 through the trunnion 22 and is bent downwardly, so as to discharge into a trough 27, surrounding the valve-casing. The inner end of the pipe 25 projects to the upper portion of the chamber 20, as shown at 26, so that the most highly heated water or any steam which may be generated is discharged. The trough 27 is filled with water by the discharge from the pipe 25 and receives the lower edges of the walls of the valve-casing, so as to form a water seal to prevent the escape of gas. Troughs 28 29 extend across the interior of the valve-casing 18 and rest upon the upper ends of the walls 15 and 16, and cross-bars 30 and 31, extending across the interior of the

valve-casing and secured to its side walls, are provided with down-flanges which enter these cross-troughs, the cross-bars forming the points of contact for the valve 19.

V-shaped flanges 32 33, instanding from the side walls of the valve-casing 18, extend from each side of the lower end of the conduit 10 to the inner face of each of the walls 15 16. The apexes of these flanges are directed toward each other and are in line with the valve-trunnions and are spaced apart sufficiently to allow the free movement between them of the valve, the flanges being so disposed that in each of its extreme positions the valve rests against the upper leg of one of the V-shaped flanges and the lower leg of the other. The faces of these flanges with which the valve contacts are dressed, so that a good and close-fitting seat is provided for the valve. The gas being heavily loaded with carbon quickly coats all of the surfaces with soot, thereby the more effectually closing the joints.

It will be seen that the valve is provided with sharp angles at each of its ends, which contact, respectively, with the side walls of the conduits 10 and 13. This construction we find preferable, as the sharp angles more effectually cut into the accumulated soot than would a flat surface, and this permits the valve to approach more snugly to its seats.

The valve-casing is preferably made of several sections—viz., the side walls 34 and 35 and a pair of top pieces 36 37, which extend from the conduit 10 downwardly to the bottom of the casing—and the several sections are securely bolted together. In assembling the parts the top pieces 36 37 are first bolted to one of the sides, and this part of the casing being set in place the valve is fitted thereto, when the other side of the casing is applied and secured.

In the construction shown in Figs. 4, 5, and 6 the valve-casing is somewhat changed in form, its central portion 38 being approximately tubular in form and the end portions 41 42 being arched transversely at their juncture with the central portion, the flue 39, leading to the stack, being also round. When this form of casing is employed, the valve is circular, as shown at 40, and the flanges, as 32 and 33, may be dispensed with, as the circular form of the central part of the casing provides seats for the valve. The central portion 38 of this style of valve-casing may be centrally and vertically divided, and the two end pieces 41 42 may each be of a single casting. In assembling the two end pieces are secured to one of the sections of the central portion. The valve is then placed and the other section of the central portion of the casing is applied.

In operation water is circulated through the chamber of the valve at a sufficient velocity to prevent the valve from becoming heated so as to be either burned or warped and is discharged into the trough 27, thereby keeping the latter well filled.

The valve and its casing herein described are equally effective in connection with the air-service as with the gas-service.

An overflow-pipe 43 is provided to convey the water from the trough 27.

We claim as our invention—

In a regenerative furnace, in combination, a casing having an induction-conduit, two furnace-conduits and a stack-conduit, a reversing-valve for controlling said conduits, such valve being chambered and having tubular trunnions; means for passing water into and out of the valve-chamber through such trunnions; a pipe leading downwardly from the outer end of the duct of the eduction-trunnion; and a trough surrounding the valve-casing and into which the walls thereof enter, and being in a position to receive the water discharged from the valve-chamber.

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