J. B. McKENNAN.

LIFT VALVE FOR FURNACES.

APPLICATION FILED MAY 28, 1909.

947,201. Patented Jan. 18, 1910.

Fig. 1.

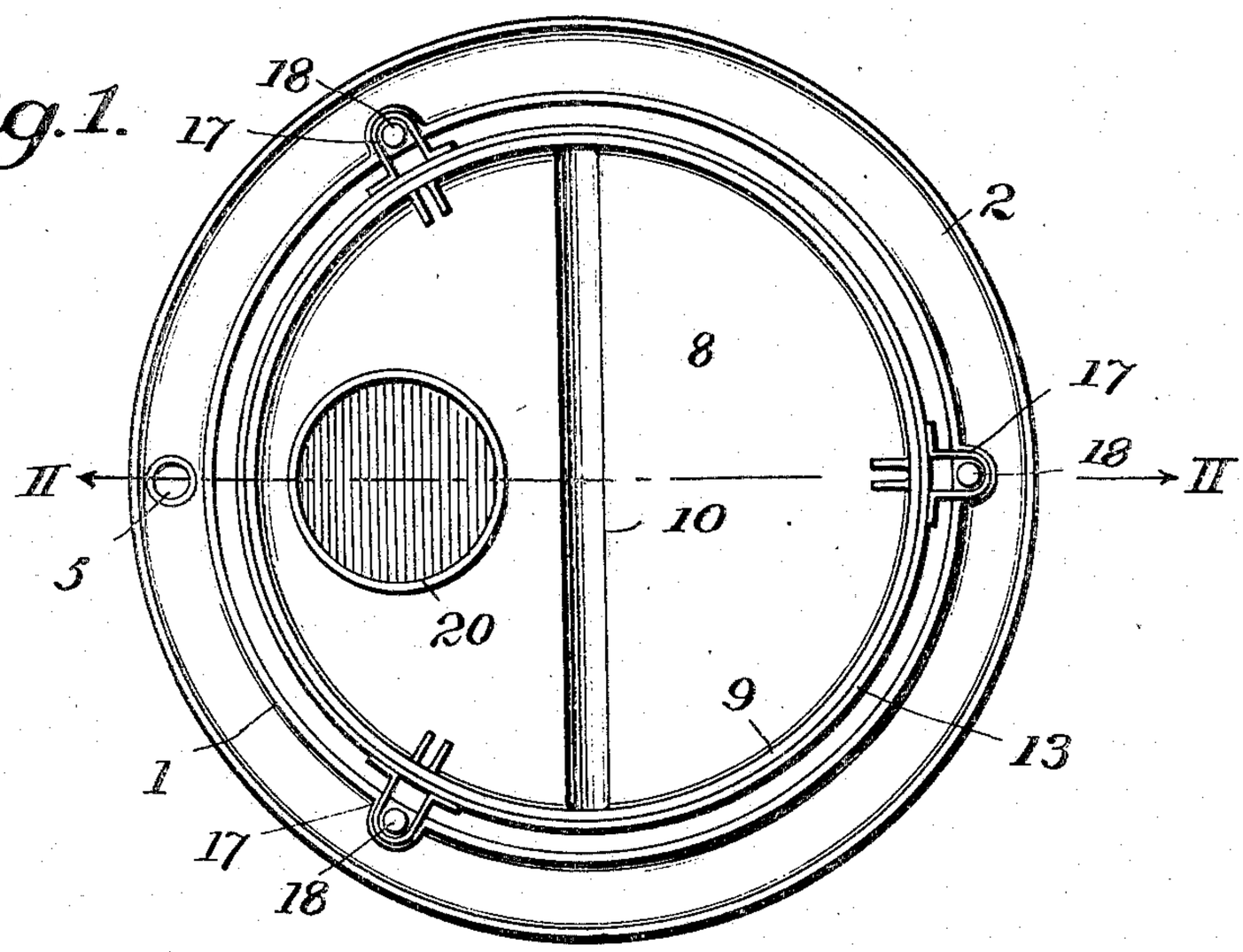
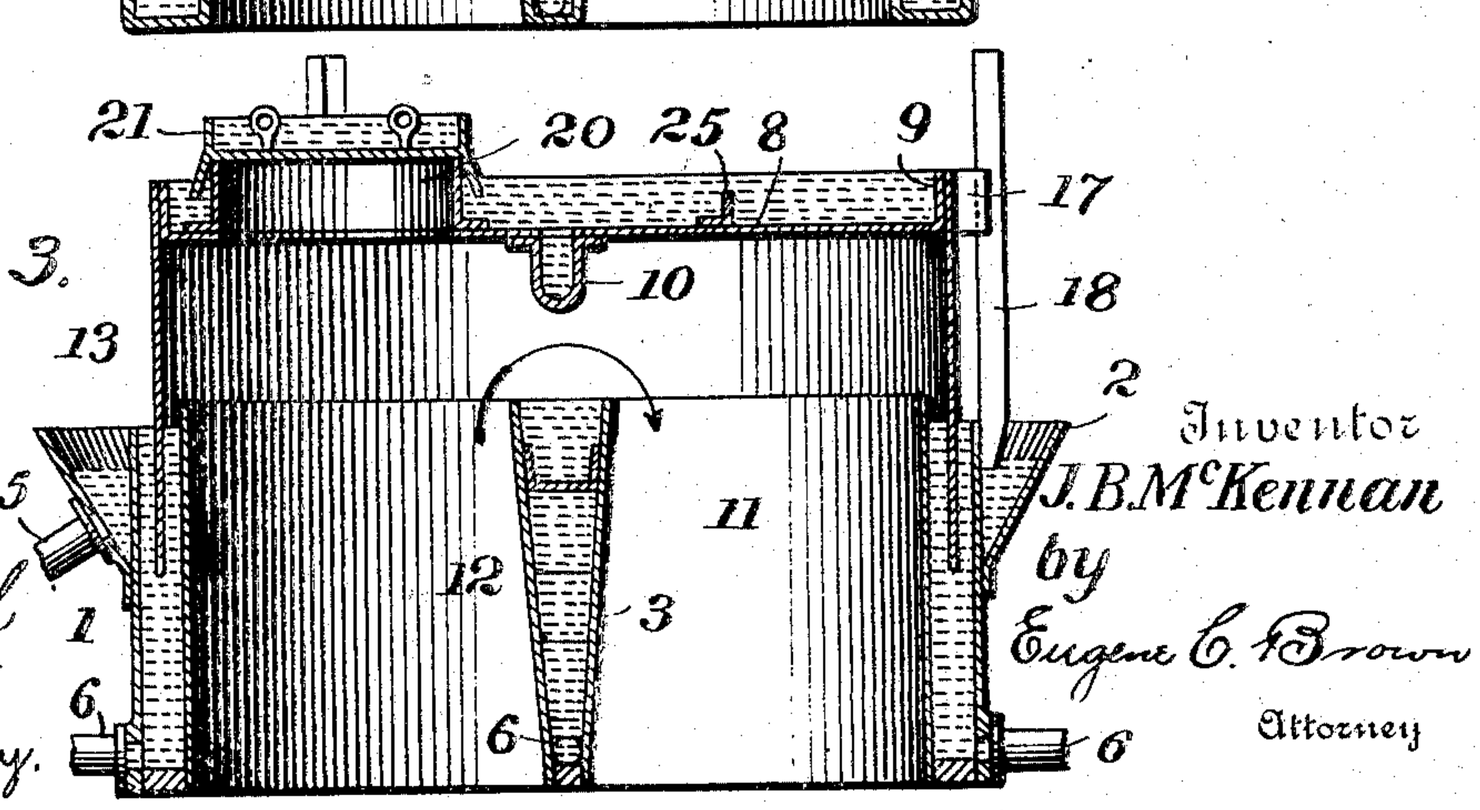



Fig. 2.




Fig. 3.

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# UNITED STATES PATENT OFFICE.

JACOB B. McKENNAN, OF PUEBLO, COLORADO.

## LIFT-VALVE FOR FURNACES.

947,201. Specification of Letters Patent. Patented Jan. 18, 1910.

Application filed May 28, 1909. Serial No. 498,887.

*To all whom it may concern:*

Be it known that I, JACOB B. McKENNAN, a citizen of the United States, residing at Pueblo, in the county of Pueblo and State of Colorado, have invented certain new and useful Improvements in Lift-Valves for Furnaces, of which the following is a specification.

My invention relates to water-sealed valves of the general type disclosed in my Patent No. 884,033, and for use in flue and valve systems in regenerative furnaces such as shown in my Patent No. 881,328.

The object of this invention is to provide a simple lift-valve for controlling the admission and amount of flow of gases between adjacent flues, which shall be water-sealed, simple in construction and operation, and which may be constructed with thin walls in order to secure the cooling effect of the outside air and to displace as small an amount of water as possible in the water-seal. These and other objects which will appear from the description hereinafter given, are attained by means of the constructions illustrated in the accompanying drawings, in which—

Figure 1 is a plan of one form of my improved valve; Fig. 2 is a vertical section on the line II—II of Fig. 1; and Fig. 3 is a vertical section of another form of my valve.

The valve-hood and water-pan may be of cast steel, and should preferably be made as thin as possible. In the form shown in Fig. 2, the casing 1 is shown as an integral casting having the double walls $1^a$ and $1^b$, forming a trough for the water-seal and for the flue-separating flange of the valve. I have shown the outside wall $1^a$ slightly lower than the inner wall $1^b$, and the overflow trough 2, provided with a drain or sewer connection 5, to keep the trough normally empty. The inlet pipe 6 is located near the bottom of the water-pan so that the cooler inflowing water will come in contact with the hottest part of the casing, the water overflowing at the top and being maintained substantially at a constant level.

The hood or lift-valve may have a cast steel top 8, provided with a marginal rim 9, to retain water for cooling the same, and a depending diametral rib 10, which is water-sealed between the central double-walled portion 3 when the valve is in its lower position as shown in Fig. 2, closing communication between the ports 11, 12, of the valve casing, which constitute the terminals of the adjacent uptakes or flues. The depending cylindrical flange 13 of the valve which extends nearly to the bottom of the water-seal when in lower position, may be riveted to the top portion 8. As above stated, this should be made as thin as possible in order to secure the cooling effect of the outside air when in the upper or open position shown in Fig. 3, and to displace as small an amount of water in the pan as possible.

The hood may be suspended and lifted by means of guy rods 14 attached to a rod 15, connected to the plunger of a fluid pressure cylinder or other lifting device, and may be guided by means of angle irons or loops 17 sliding upon vertical guides 18 bolted to the casing or having a reduced portion passing through an aperture therein and pinned in position as shown in Fig. 1.

When the multiplex valve is used to seal and connect adjacent gas flues, the top 8 of the valve-hood will be imperforate in order to close both flues when in the lower position and to connect one with the other when in the raised or upper position. When, however, the valve is to be used as a combined air- and draft-valve to simultaneously control the connection of the flue of a regenerator to the stack and the admission of air to the regenerator, I provide the valve-top with an orifice 20, which is closed by the disk-valve 21 when the hood is raised. In the drawings, I have illustrated the valve as duplex as an air- and draft-valve, deeming it unnecessary to also show the admission of the disk-valve when the duplex valve is employed as a gas-valve.

The disk-valve is suspended by a suitable flexible connection 22, such as a wire cable. In the form shown in Fig. 2, the disk 21 is tapering circumferentially and fits snugly into the beveled seat on the rim of the orifice, this rim extending above the level of the water on top of the hood. In Fig. 3, I have shown the disk as provided with a depending flange which forms a water-sealed joint when resting upon the rim of the orifice. The top of the disk-valve 21 is dished to hold cooling water, which may of course be supplied from a pipe or faucet, the overflow being caught by the top of the hood, or a special overflow may be provided.

It will be understood that the orifice 20,

constitutes the inlet for the air-regenerators of the furnace, and that when the multiplex valve is in its lower position, as shown in Fig. 2, the flue 11, leading to the stack is closed, while air is admitted through the orifice 20 to the flue 12, leading to the regenerator. When the hood is raised into the position shown in Fig. 3, the disk-valve 21 is picked up and closes the orifice 20, shutting off the air, and the regenerator is then connected directly to the stack through the flues 12 and 11.

When my multiplex valve is used as a gas-valve, the adjacent flues will be connected when the hood is raised and the volume of gas passing from one flue to the other may be regulated by the amount the hood is lifted. When the hood is in its lower position, each of the flues will be closed by a water-sealed joint, the diametral rib 10, dipping into the water in the central partition 3.

While I have illustrated my multiplex-valve in the duplex form, it is evident that I may provide the same with more than two portions or ports where the flues converge and can be simultaneously controlled. When it is deemed advisable I brace the top of the hood with one or more stiffening angle irons 25.

In Fig. 2, I have shown the parts of the valve casing as an integral casting and likewise the parts forming the top of the hood. I may, however, form the several parts separately as shown in Fig. 3 and secure them together by riveting or otherwise. Again, in Fig. 3, I have provided a plurality of inlets 6, supplying water to the valve-casing.

In my present invention the walls of the flue terminals are all flush and the valve casing is adapted to rest directly thereon to cap the flues and form the port connection therebetween. One simple lifting mechanism operating vertically serves to control the flow of fluid between the flues or to seal one and open the other to the admission of air, in case the valve is an air and draft-valve. The parts will be thoroughly cooled and the water maintained at the proper level. These and other advantages will be apparent to those skilled in the art.

It is obvious that changes may be made in the construction without departing from the spirit of my invention, and within the scope of the claims; since

What I claim is—

1. A furnace valve, comprising a plurality of coterminous vertical flues or ports, a double-walled casing surrounding and separating said flues, means for supplying water between said casing walls, a trough surrounding the upper portion of said casing, a lift-hood having an upturned flange extending above the hood-top, a water-cooled diametral rib adapted to seat in the flue-separating portion of the casing and a cylindrical shell vertically movable within the casing and arranged to be substantially submerged therein when in its lowest position.

2. A furnace valve comprising a plurality of coterminous vertical flues or ports, a double-walled casing surrounding said flues and having an intermediate double-walled partition of the same depth as the casing walls and separating said flues, a trough surrounding the upper portion of said casing, means for supplying water between the walls of said casing and partition, and a lift-hood having a dished top provided with a hollow diametral rib adapted to seat in said partition, and having a cylindrical shell vertically movable between the casing walls.

3. A furnace valve comprising a plurality of coterminous vertical flues or ports, a double-walled casing surrounding said flues and having an intermediate double-walled partition of the same depth as the casing walls, means for supplying water between the walls of said casing and partition at the bottom thereof, an overflow trough surrounding the upper portion of the casing, and a lift-hood having a dished top provided with a hollow diametral rib adapted to seat in said partition, and having a cylindrical shell vertically movable within the casing walls.

4. A furnace valve comprising a plurality of coterminous vertical flues or ports, a double-walled casing surrounding and separating said flues, means for supplying water between said casing walls, and a lift-hood having a shell vertically movable between said casing walls, and a flanged top to hold a pool of water and a valve-controlled orifice having a peripheral flange extending above the water level of the top.

5. A furnace valve comprising a plurality of coterminous vertical flues or ports, a double-walled casing surrounding and separating said flues, means for supplying water between said casing walls, and a lift-hood having a shell vertically movable between said casing walls, and a water-cooled top having portions corresponding to said flues, separated by a water-cooled rib, an inlet in one portion of the top and a flexibly supported sealing disk adapted to close said inlet when the hood is raised.

6. A furnace valve comprising a plurality of coterminous vertical flues or ports, an integral casing having double walls forming water channels surrounding and separating said flues and an overflow trough surrounding the upper portion of the walls, a lift-hood having a single-walled shell adapted to move vertically within the casing walls, and an integral top having an upturned peripheral flange, a hollow diametral depending rib and a flanged orifice.

7. A furnace valve comprising a plurality of coterminous vertical flues or ports, an in-

tegral casing having double walls forming water channels surrounding and separating said flues, and an overflow trough surrounding the upper portion of the walls, means for supplying water to said channels, a lift-hood having a single-walled shell adapted to move vertically within the casing walls, and an integral top having an upturned peripheral flange, a hollow diametral depending rib and a flanged orifice, and vertical guides for the hood secured to the casing walls.

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

JACOB B. McKENNAN.

Witnesses:
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FRED DARROCH.