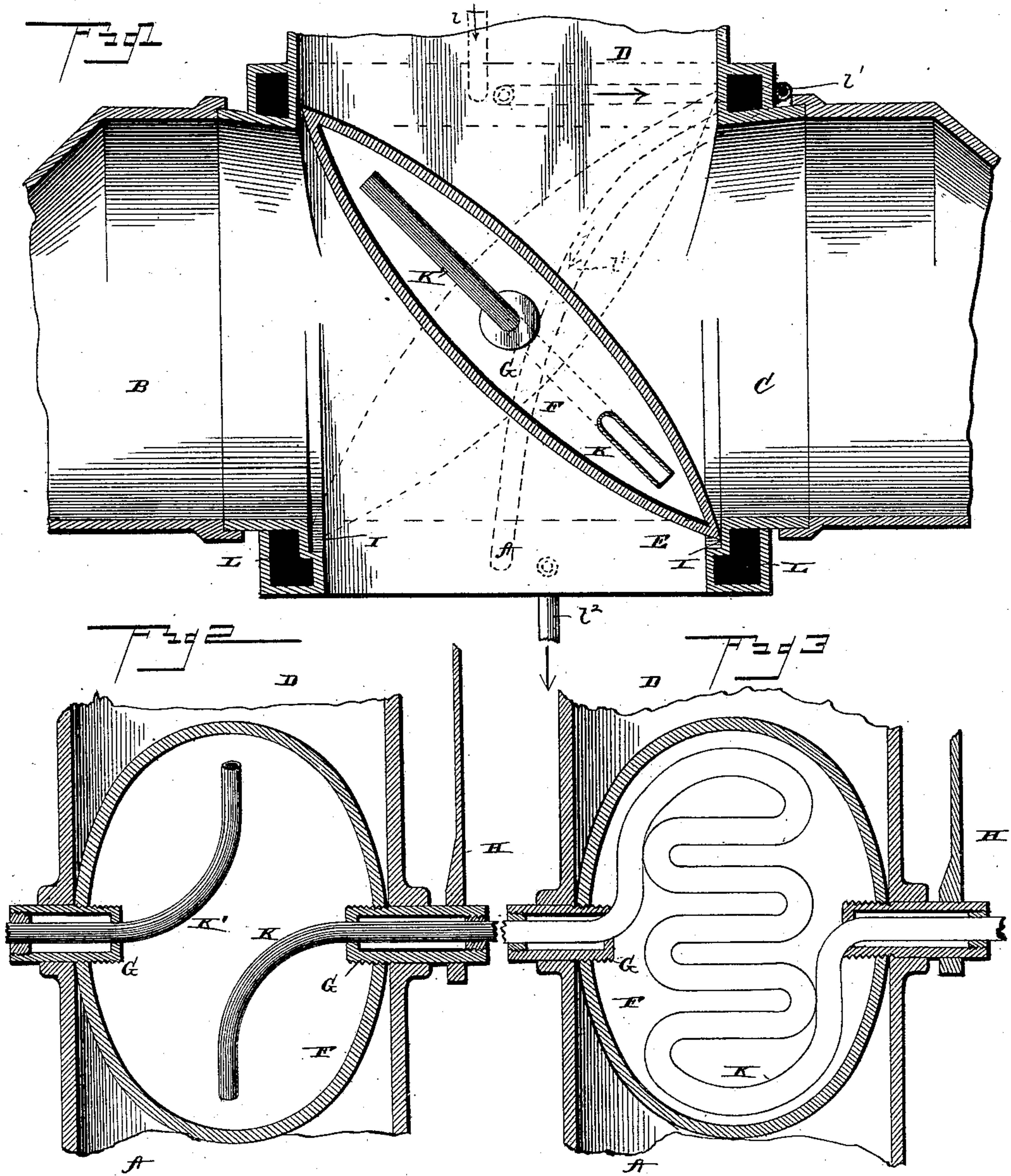


(No Model.)

J. W. HIGGS.  
VALVE FOR GAS BURNING FURNACES.

No. 452,347.

Patented May 12, 1891.



Witnesses  
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# UNITED STATES PATENT OFFICE.

JOSEPH WILLONON HIGGS, OF SHARON, PENNSYLVANIA.

## VALVE FOR GAS-BURNING FURNACES.

SPECIFICATION forming part of Letters Patent No. 452,347, dated May 12, 1891.

Application filed June 11, 1890. Serial No. 354,997. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH WILLONON HIGGS, a citizen of the United States, residing at Sharon, in the county of Mercer and State of Pennsylvania, have invented certain new and useful Improvements in Valves for Gas-Burning Furnaces; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates particularly to an improved damper-valve for gas-burning furnaces, the object of the invention being to construct a valve with certain accessories, whereby an accurate and positive set of the valve can always be had.

With this object in view my invention consists in the peculiar construction of various parts, and the novel combination of said parts, such as shown in the accompanying drawings, and fully explained hereinafter.

In the drawings forming a part of this specification, Figure 1 is a vertical sectional view of the damper, hoods, &c. Fig. 2 is a sectional view through the valve and valve-chamber. Fig. 3 illustrates a modified form.

Referring to the drawings, A indicates a chamber or passage leading from the gas-producer.

B indicates the passage through which the gas is conducted to be burned, and C indicates a hood or passage through which are led the products of combustion to the stack D. A valve-chamber E is arranged at the juncture of the passages A, B, and C, and in said valve-chamber is journaled a valve F, said valve being hollow, as shown, and carrying at each side the tubular bearings G, journaled in the casing. The valve is of a size sufficient to extend from one side of the gas-producer chamber to the diagonally-opposite side of either the gas-delivery pipe B and the passage or hood C. By this means the gas can be entirely shut off from one passage and directed to another, according to the will of the operator. The valve is operated by means of the hand-lever H, which passes through or is attached to one of the tubular journals.

I indicates the valve-seats, which consist of recesses *i i*, of approximately V shape in

cross-section, and which are adapted to receive the adjacent edge of the valve and protect the latter from the force and heat of the gases.

In the valves now in use the ends, being constantly exposed to the heat of the burning gases, become warped and twisted, and consequently do not fit closely upon their seats, and there is no certainty in directing the gas. My improved valve is intended to remedy this evil in particular, and to do this I force a stream of cold water into the hollow valve near its hottest end. By cold water I mean water of a temperature low enough to cool the heated parts of the valve, but not cold enough to crack the same. To lead the water into the valve at the proper place, I employ the pipe K, which is connected with one of the tubular journals and is curved down toward the warmer end of the valve. In the opposite journal is arranged an overflow-pipe K', which carries off the water after having been heated by contact with the warmer end of valve.

To obviate burning of the valve-seats, I provide water-chambers L L, located adjacent to said valve-seats and at opposite sides of the casing. By this construction the intervening portion of the casing is thus left free from contact with the chambers L, the purpose of which will appear farther on. The chambers are adapted to have a current of cold water constantly circulating there-through; and to effect this end means are provided which preferably consist of an inlet-pipe *l* entering the upper chamber L, a pipe *l'* communicating with the upper and lower chambers, and an outlet-pipe *l''* projecting from the latter chamber.

The practical operation of my improved apparatus is as follows: The damper-valve being turned to the position shown in Fig. 1, the gas coming from the producer passes into the valve-chamber, where it is deflected by the valve into the conducting-passage B, which leads to the furnace, where the gas is consumed. The heated products of combustion pass from the furnace through the passage C to the stack and are so directed by the opposite side of the valve. The portions of the valve adjacent to the passage leading



from the furnace are highly heated and would warp or twist, but the stream of water constantly flowing through said valve prevents this and keeps the valve true upon its seats; and to prevent the seats burning out water-chambers are arranged adjacent to them, as shown.

In gas-burning furnaces it becomes necessary at times to reverse the operation just described and have the gas pass from the producer to the hood; and to accomplish this the lever is operated and the valve reversed, as shown in dotted lines in Fig. 1. By the employment of two independent chambers L, located adjacent to the valve-seats and free from contact with the intervening portion of the valve-casing, it will be obvious that the sides of the casing are permitted to become heated, thereby preventing generation of tar and the consequent clogging of the valve, which would thus render the latter inoperative.

In Fig. 3 I have shown a slightly-modified form of valve, which consists in a coiled pipe arranged within the valve, with its ends passing out through the tubular journals. Water entering at one side passes to the warmer part of the valve and gradually passes up and out in a manner similar to that already described.

I am aware that hollow valves of this character have been heretofore constructed, employing a partition extending downwardly therein from the center, and a second partition extending upwardly from the center of the valve, and inlet and outlet ports separated by said partitions, the object of such construction being to afford continuous circulation of a cooling medium through the valve, the latter being adapted to be at all times filled with the cooling medium; and I am also aware that cooling-chambers have been provided which entirely surround the valve, and are also adapted to receive a cooling medium; but to such constructions I lay no claim, my invention consisting in the construction,

combination, and arrangement of parts, as specifically set forth in the following claims.

Having thus described my invention, what I claim is—

1. In a valve for gas-burning furnaces, the combination, with a valve-casing provided with valve-seats, and a valve disposed in said casing, of chambers surrounding said valve-seats and disposed at opposite sides of the casing, the intervening portion of the latter being free from contact therewith, and means for effecting circulation of a cooling medium through said chambers, substantially as and for the purpose set forth.

2. The herein-described valve for gas-burning furnaces, comprising a casing, chambers located, respectively, at the top and bottom thereof and independent of each other and adapted to receive a cooling medium, the hollow valve proper journaled horizontally and having its upper and lower ends only adapted to contact with said chambers, and means for effecting circulation of a cooling medium through the valve, comprising an inlet-pipe passing through one of the valve-bearings and extended down within the valve to near the bottom thereof, and an outlet-pipe passing through the opposite bearing and extending interiorly to near the top of the valve, all arranged substantially in the manner and for the purpose set forth.

3. In a valve for gas-burning furnaces, the combination, with a valve-casing provided with valve-seats, and chambers surrounding the latter and disposed at opposite sides of the casing, of a hollow valve disposed in said casing, and means for effecting circulation of a cooling medium through said chambers and valve, substantially as and for the purpose set forth.

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

JOSEPH WILLONON HIGGS.

Witnesses:

LEVI HIGGINS,

JAS. C. EDMUNDS.