

(No Model.)

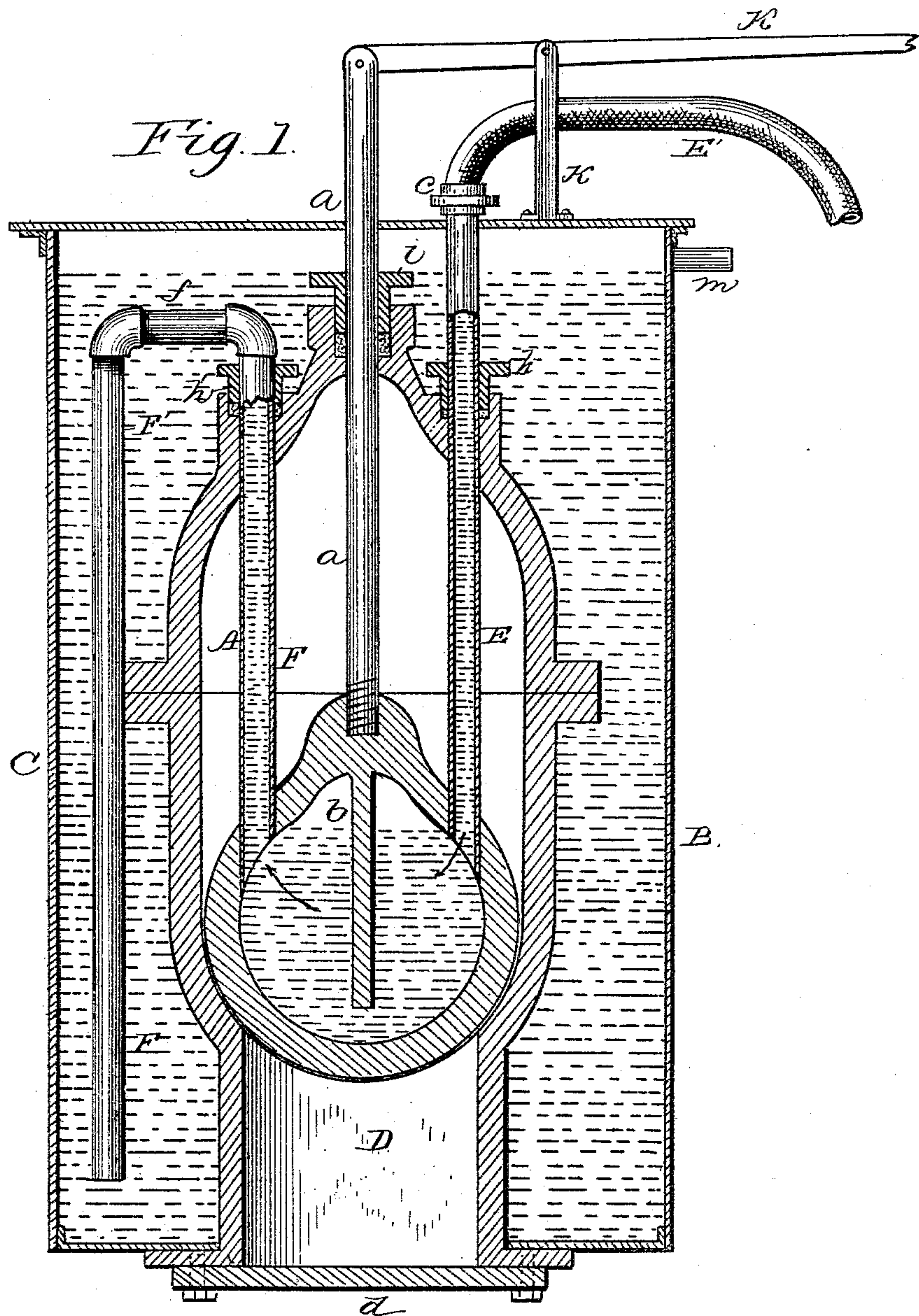
2 Sheets—Sheet 1.

J. HANLON.

WATER COOLED VALVE.

No. 300,602.

Patented June 17, 1884.



WITNESSES:

J. M. Reynolds
A. L. Duff

INVENTOR

John Hanlon
BY *O. E. Duff*
ATTORNEY

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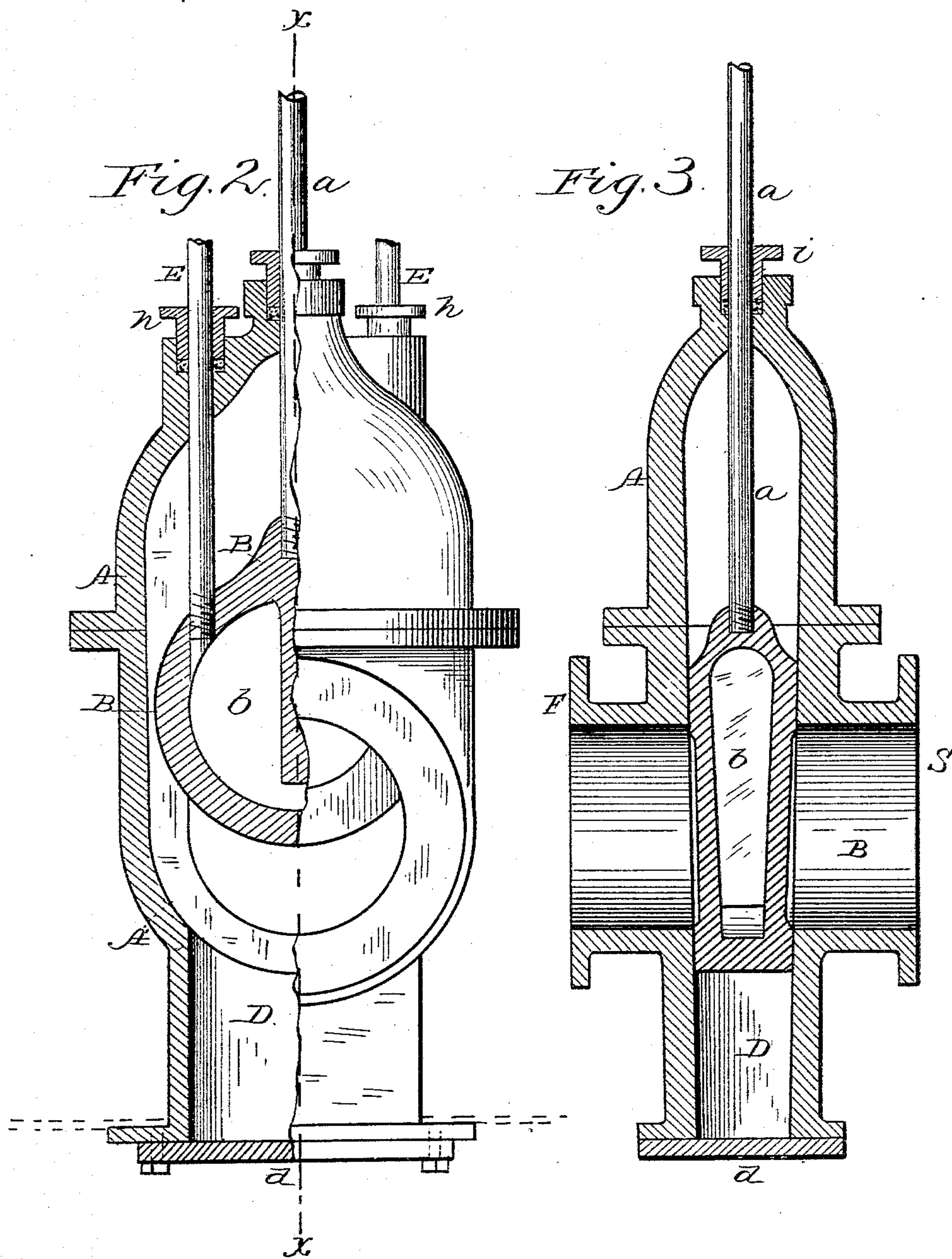
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UNITED STATES PATENT OFFICE.

JOHN HANLON, OF NEW YORK, N. Y.

WATER-COOLED VALVE.

SPECIFICATION forming part of Letters Patent No. 300,602, dated June 17, 1884.

Application filed March 8, 1884. (No model.)

To all whom it may concern:

Be it known that I, JOHN HANLON, of the city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Water-Cooled Valves; 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification.

This invention relates to water-cooled valves adapted for use in the pipes, flues, and connections of gas-generators, blast-furnaces, and in other pipes through which a highly-heated blast or current of gas or air is passed.

Heretofore water-cooled valves have been proposed, and when used have commonly proved defective and inoperative for the want of suitable means for cooling the valve-casing and seat and suitable means for circulating the cooling-fluid in the valve, &c.

A water-cooled valve and case have been described in which the valve-case was surrounded by a water-chamber, and water-pipes connected with the hollow valve passed through the valve-case and opened into the water-chamber; but such device proved defective in operation for want of efficient means to cause circulation of the cooling and protecting fluid through the hollow valve and out into the surrounding water-chamber.

In valves heretofore used in the pipes of gas and blast furnaces much annoyance and trouble have been caused by deposits of soot and ashes in the valve seats and cases, and no means were provided for receiving such deposits and removing them; consequently the seats and cases became clogged and the valve rendered defective and inoperative to produce a tight joint in the pipe.

The object of my invention is to overcome and remedy these difficulties, and to so construct the valve apparatus that a perfect circulation of the cooling-fluid through the hollow valve is secured, and to provide simple means for collecting and removing the dust and ashes or any other foreign matter which may be deposited in proximity to the valve.

In carrying out my invention the hollow valve is provided with a transverse pendent diaphragm or partition extending from its top to near its bottom. The inlet water-pipe connecting on one side of such diaphragm passes through the surrounding water-chamber of the casing, where it connects with the flexible water-supply pipe or hose, and the outlet water-pipe connecting with the water-space of the valve on the opposite side of the diaphragm passes through the valve-casing, and, there turning down, extends to near the bottom of said water-chamber, where it opens for the escape of water. The inlet and exit pipes of the valve are arranged in this line of the current, whereby the cooling-fluid is brought in close contact with the sides of the valve. Each pipe connects with the water-space of the valve in a line nearly tangential to the inner curved surface of the valve, whereby, in connection with the partition, a current of water is directed around against the curved valve-wall, where it makes a joint with its seat, and where uniform cooling is most important to prevent warping or uneven expansion, so that a tight joint may always be formed when the valve is adjusted to its seat.

The construction described is quite essential and important, as the valves are often made of large diameter, and without such construction could not be evenly cooled and protected, and the partition is useful in strengthening the valve-body. A tight valve-joint is essential, as in many connections a leak of gas or air would cause a destructive explosion in the pipe or connected chamber. I also provide the gas-pipe section containing the valve, just below the valve-seat, with a dust-trap in the form of a pocket or deep recess, having a close-fitting removable lid at its outer end outside of the water-chamber.

It has been proposed to place a dust-valve "at the bottom of a valve-body;" but only a small perforation was represented, with a small valve for closing it. Such arrangement, however, is not capable of performing the function of my wide dust-chamber having a removable lid or cap at its outer end, whereby soot and ashes may be deposited from the valve and its seat and stored for a long time, (several days or weeks,) and then, at a convenient interval in

the furnace operation, cleaned out by opening said lid or cap. A dust-chamber in the connection shown and used by me, and constructed to be entirely below the conduit closed by the valve, and of sufficient area to contain accumulations of soot, has never, to my knowledge, been used or described prior to my invention. It will be observed that my apparatus is constructed with the valve-seat entirely in the valve-casing, and that no flange or other obstruction projects into the pipe from its inner surface to impede the flow of gas or air and cause an accumulation of dust and ashes in the pipe, as in other defective devices; and for this reason the dust-chamber opens to the valve-seat beyond the inner surface of the pipe, and extends entirely outside thereof. Valve-seats and flanges projecting into the pipe, as represented in devices heretofore proposed, would cause much annoyance and expense in practical operation; and in carrying out my invention I remove all such objectionable features.

In the drawings, Figure 1 represents a vertical transverse section of a valve and its connections and means for maintaining a practically constant temperature constructed according to my invention. Fig. 2 represents an elevation, partly in section, showing the valve and its casing without the surrounding reservoir. Fig. 3 represents a section on line *x x*, Fig. 2.

The pipe-section S has secured to and extending above it the valve-casing A, properly chambered for receiving the valve B, which is arranged to slide in it and down through the diameter of the pipe to its seat A'. The valve B is chambered or made hollow, and is provided with a pendent transverse partition, *b*, extending from the top of the water-space to near the bottom thereof. On one side of the partition the inlet-pipe E connects for the cooling-fluid. This pipe slides through a bearing or stuffing box, *h*, in case A, and extends above, either into chamber C or through and above the top thereof. In either position it is connected by a union or other coupling, *e*, to a flexible pipe or hose, E', leading from any suitable water supply or source of any desired cooling-fluid, and permitting the reciprocating movement of pipe E when the valve is moved up and down. The outlet-pipe F connects with the water-space of the valve on the opposite side of the partition, and, passing through stuffing-box *h'*, connects by elbows and short pipe *f'* with the downwardly-extending pipe F', which opens near the bottom of water-chamber C. The pipes E F serve not only for the supply and discharge of the water, but act at the same time as means of insuring accuracy in the movements of the valve.

The rod *a*, controlling the movement of the valve, may be connected exteriorly with any suitable mechanism to give the valve an upward and downward movement when desired.

In the drawings a pivoted lever, K, is shown resting upon or pivoted to a standard, *k*, for

operating the valve to open or close the air or gas conduit to any desired degree. The pipe E may receive a supply of cooling-fluid from a reservoir situated on a higher horizontal plane than the valve and the pipe.

The lower portion of pipe-section S, just below the valve-seat A', is provided with a downward extension or chamber, D, forming a dust-trap, whereby soot or ashes falling on or about the sloping valve-seat are collected for removal at any convenient time. The valve and seat are thus at all times kept free from foreign matter, and a tight joint formed when the valve is closed. This is a very important matter about a gas-generator or metallurgic furnace, in order to prevent air leaking back into a gas-conduit and gas from leaking back into an air-conduit, and thereby causing explosions and other injurious results. A close-fitting removable lid, *d*, is secured to the lower end of the dust-chamber, for convenient removal when it is desired to clean the chamber or inspect the valve, its bearings, and seat. The dust-chamber may be cast with the pipe-section.

The water-chamber C may be cylindrical or circular. It surrounds the valve-casing and pipe-section for a short distance on each side of the valve, and serves to keep the parts about the valve suitably cooled and well-preserved. The tank or chamber C is riveted to the flange about the lower end of the dust-trap, and tightly secured to the pipe-section on each side, if desired, to the flanges of such section, and it is provided at or near its top with an overflow-pipe, *m*.

The valve and casing may be reversed or placed in various positions with regard to the conduit, with a suitable modification of the construction, without departing from the spirit of my invention.

The water-cooled valve and connecting-pipes may be used without the surrounding water-tank, as the invention is not limited to the tank in such connection.

The operation of my improved valve apparatus will readily be understood from the previous description without further amplification.

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

1. In combination with a conduit, a hollow water-cooled slide-valve having a partition provided with an opening or passage, and the inlet and outlet pipes for the cooling-fluid, connected on each side of such partition, as described, for securing a better circulation of the cooling-fluid.

2. The hollow valve having a pendent partition, *b*, provided with a passage near or at its bottom, in combination with the inlet and outlet water-pipes connecting on each side of such partition, as set forth, and passing through stuffing-boxes in the casing, whereby they may be moved up and down with the valve.

3. The hollow valve having a partition pro-

vided with an opening, in combination with the inlet-pipe passing through a stuffing-box in the valve-casing and connecting with a flexible supply-pipe, and the outlet-pipe passing through a stuffing-box in the casing and discharging on the outside of such casing, said pipes connecting with the water-space of the valve, as set forth, whereby a complete and uniform circulation of water through the valve is secured.

4. The hollow sliding valve, in combination with its casing, an inlet water-pipe adapted to discharge water tangentially against the inner curved surface of the valve, and connecting with a flexible supply-pipe, and an outlet water-pipe passing through a stuffing-box in the casing, and discharging outside thereof, as and for the purpose described.

5. A hollow sliding valve and its casing, in combination with the inlet-pipe connected with a flexible supply-pipe, an outlet-pipe discharging outside of the casing, said pipes connecting with the water-space of the valve, as set forth, and a water-tank surrounding the valve-casing, all constructed and arranged as described.

6. In combination with a pipe and valve, a dust-chamber opening in proximity to the valve-seat, as set forth, for receiving deposits of soot and ashes, and thereby preventing clogging of the valve and its seat, as described.

7. The combination of a hollow sliding valve and its casing with an inlet-pipe, a flexible supply-pipe connected with its outer end, an outlet-pipe passing through the casing and extending down below the valve-seat and discharging into a water-tank, and the water-tank surrounding the valve-casing and pipe-section containing the valve, for the purpose described.

8. In combination with a pipe and valve, a dust-chamber leading from the valve-seat and extending outside of the pipe, as and for the purpose described, and having at its outer end a removable tight-fitting lid, for the purpose described.

9. A pipe-section for a valve having a closed valve-casing extending in one direction, and a dust-chamber opening at the valve-seat and extending in another direction, and lying outside of the conduit, as set forth, and having means for closing its outer end, for the purpose described.

10. The combination of the pipe or conduit, a valve-casing, a dust-chamber opening at the valve-seat, lying outside the conduit, a slide-valve, and a surrounding water tank or jacket, for the purpose described.

11. The combination, in a water-cooled valve, of the casing of a valve containing a circulation-chamber, a water-delivery pipe connecting therewith, through which water is directly forced tangentially against the inner curved surface of the valve, a discharge-pipe connecting with said chamber and delivering into the water-chamber surrounding the valve-casing, and an escape-pipe connected with said water-chamber, whereby a continued forced circulation is maintained through the valve and the cooling-chamber surrounding the casing, substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JOHN HANLON.

Witnesses:

R. FLOYD CLARKE,
JAS. E. LEADLEY.