

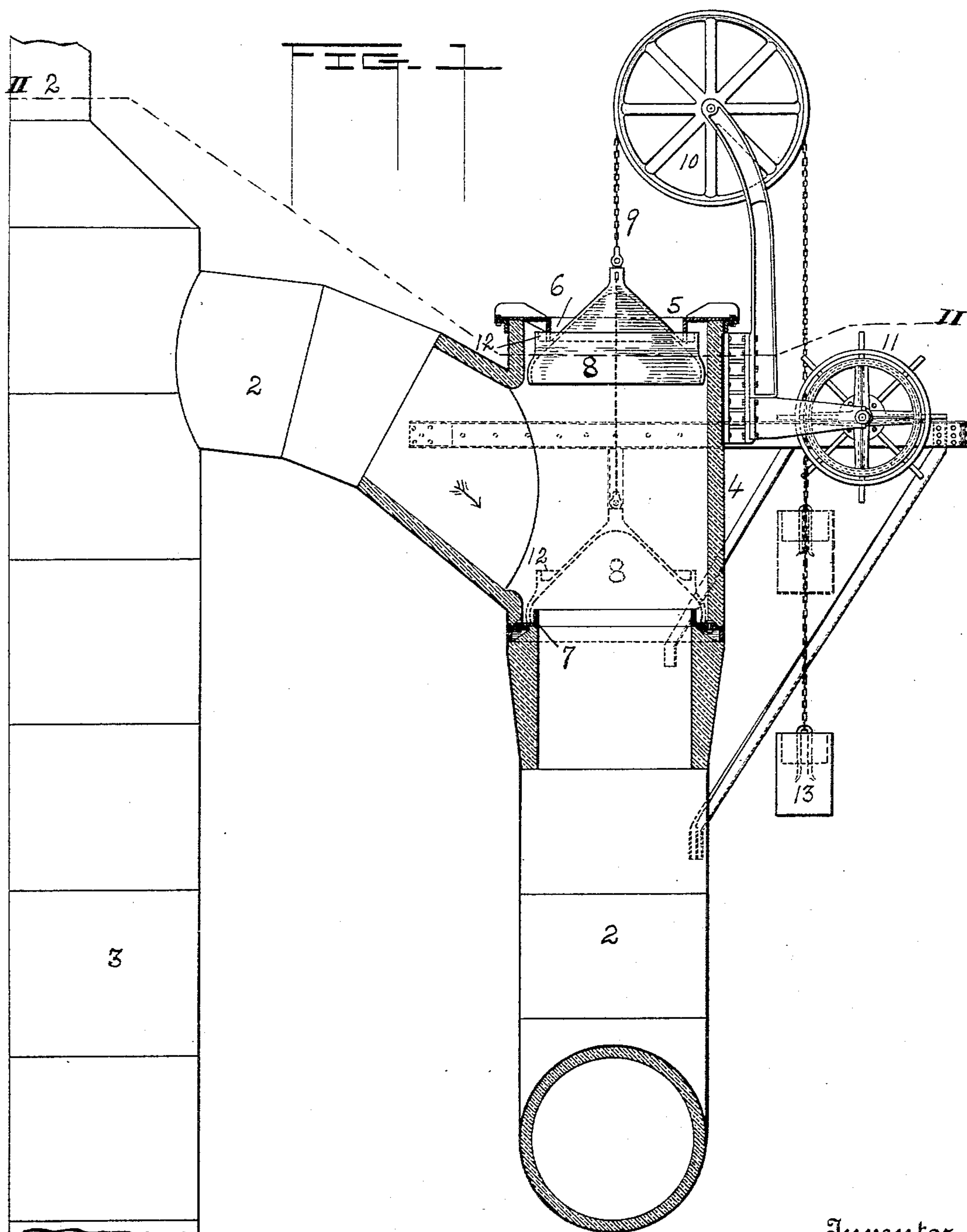
(No Model.)

2 Sheets—Sheet 1.

W. ROTTHOFF.
GAS VALVE FOR BLAST FURNACES.

No. 504,622.

Patented Sept. 5, 1893.



Witnesses
N. B. Corwin
S. M. Corwin

Inventor
William Rotthoff
by W. Baxendell & Sons
his Attorneys.

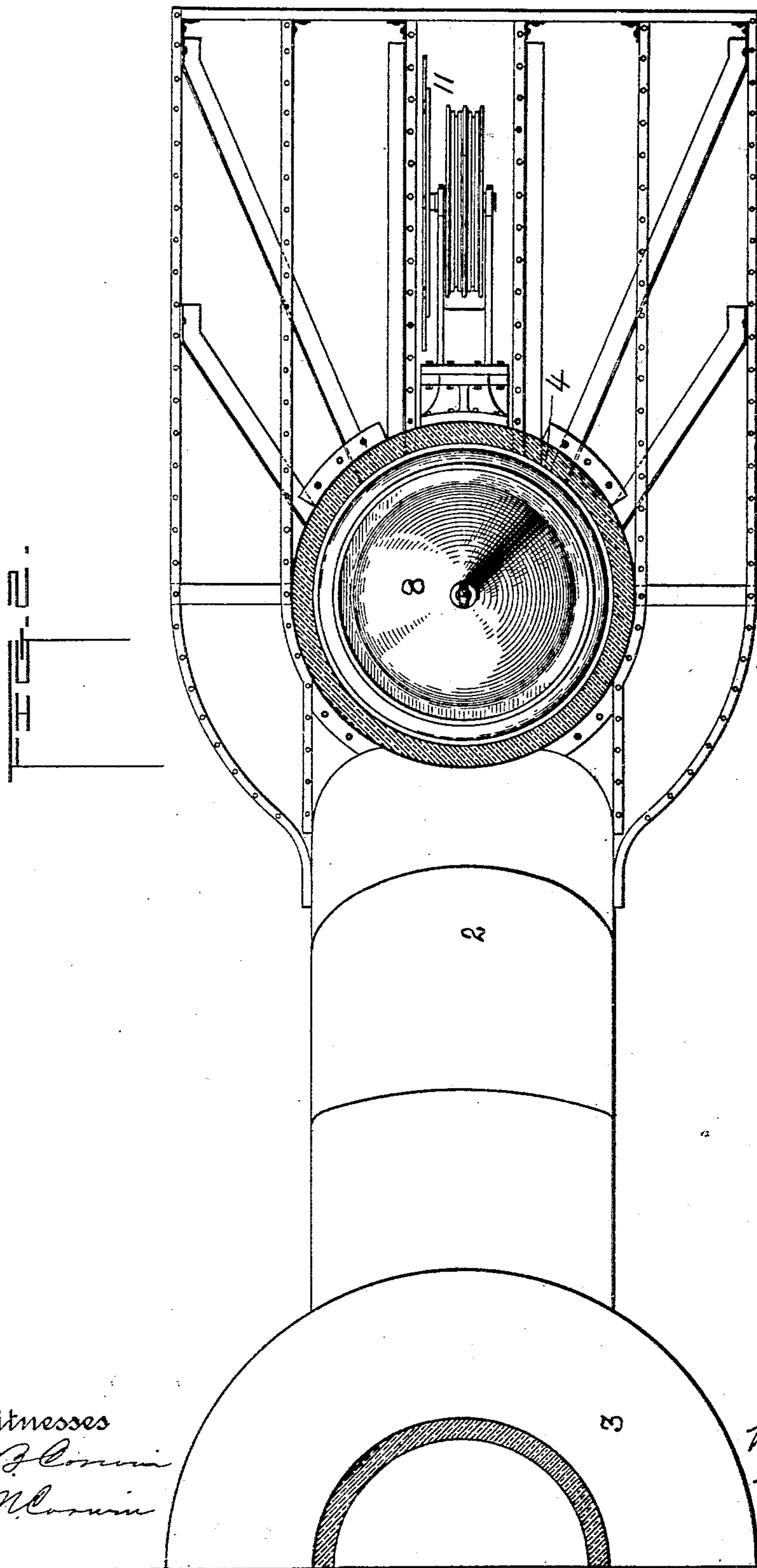
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GAS VALVE FOR BLAST FURNACES.

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Witnesses
H. A. Corwin
H. M. Corwin

Inventor
William Rothoff
by W. B. Russell
his Attys.

UNITED STATES PATENT OFFICE.

WILLIAM ROTHOFF, OF RANKIN STATION, PENNSYLVANIA.

GAS-VALVE FOR BLAST-FURNACES.

SPECIFICATION forming part of Letters Patent No. 504,622, dated September 5, 1893.

Application filed October 11, 1892. Serial No. 448,543. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM ROTHOFF, of Rankin Station, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Gas-Valves for 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 shows a vertical section of the down-comer pipe of a blast-furnace provided with one of my improved valves. Fig. 2 is a horizontal section on the line II—II of Fig. 1, showing the valve in plan view.

In the drawings, 2 represents the pipe leading from the top of the blast-furnace, and adapted to convey the hot combustible gases down to a regenerative hot-blast stove in the usual manner.

3 is the usual downward extension or drum for catching dust carried over by the gases.

My invention relates to a gas-exit pipe of a blast-furnace having an air-inlet opening adapted to be opened and, when the furnace draft is shut off, to establish through the gas-exit pipe a return air draft, which, on entering the upper part or bell of the furnace, serves to cool the same. This item of my invention is of especial advantage, because of the facility which it affords for rapidly cooling the top part of the furnace when, for any reason, it becomes necessary to make repairs at that place. It also relates to such air-inlet opening when provided with a double-acting valve of peculiar construction; and it further relates to certain improvements relating to the construction of the furnace-valve, which may be used in this and other combinations.

4 is an upright chamber, preferably of general cylindrical form, interposed in the pipe 2 below the level at which the top of the pipe or conduit 2 leaves the blast-furnace and open at the top as at 5, where it is provided with an inwardly-extending annular flange or valve-seat 6. Opposite to the valve-seat 6, in the chamber 4, is a second trough or gutter-shaped valve-seat 7, and between them is set a valve 8, preferably of mushroom type, suspended by a flexible connection 9, which may pass over a sheave 10 to a hand-winch 11, by which it may be moved vertically within the cham-

ber 4 from its uppermost position, in which the valve-seat or flange 6 fits within a guttered rim 12 on the valve, to its lowest position, shown by dotted lines in Fig. 1, in which the lower edge of the valve fits within the guttered seat 7. When in its upper position, the valve closes the air-opening 5, permitting the furnace gases to pass into the stove, and when in its lowest position, the valve closes the passage from the stove and opens the air-opening 5. The tight closing of the valve in either position may be enhanced by placing sand or similar material in the gutters 7 and 12.

13 is a counterbalance connected with the flexible connection 9.

In Fig. 1 the parts are shown in the positions which they occupy when the furnace is operating normally and the gases are passing downwardly through the pipe 2 to the hot-blast stove. If it should be desired, for the purpose of repairing the bell or top portion of the blast-furnace, to cool the same, the blast of the furnace is shut off, and then, by means of the winch 11, the valve 8 is lowered from its position shown by full lines in Fig. 1 to the position illustrated by dotted lines in that figure, thereby opening the air-opening 5 and closing the pipe 2, so as to cut off communication from the stove, whereupon a current of air enters the opening 5, passes up through the pipe 2 into the upper part of the blast-furnace, and cools it. When the blast of the furnace is again turned on, the valve is raised to its original position, thus cutting off the entrance of air and establishing free communication with the blast-furnace gas-exit and the hot-blast stove.

The advantages of my invention will be appreciated by those skilled in the art.

It will be apparent from the foregoing description that that part of my invention which relates to the air-opening may be used with valves constructed otherwise than as shown in the drawings. Also that the valve may be used for other purposes than that which I have described above. The several claims of this application are therefore unlimited by qualifications peculiar to other claims.

I claim—

1. A blast furnace having a conduit leading from the top for the exit of the furnace

gases, and having a valve-controlled air-opening situate at a level below that of the top of the conduit at the point at which it leaves the furnace, said opening being adapted to admit air to establish a return cooling draft; substantially as described.

2. A blast furnace having a conduit leading from the top for the exit of the furnace gases, and having a valve-controlled air-opening situate at a level below that of the top of the conduit at the point at which it leaves the furnace, said opening being adapted to admit air to establish a return cooling draft, and means for closing the conduit between the air-opening and the gas-main; substantially as described.

3. A blast-furnace having a conduit leading from the top for the exit of the furnace-gases, an upright valve-chamber in said conduit, said chamber provided at opposite ends with valve-seats, one of which surrounds an air-opening, and an intermediate valve con-

tained in said chamber and movable to fit either of theseats; substantially as described.

4. A valve-chamber having valve seats at opposite ends, and an intermediate mushroom valve having an annular gutter, one of said valve-seats having an annular projection adapted to fit within the gutter; substantially as described.

5. A valve-chamber having valve-seats at opposite ends, and an intermediate mushroom valve having an annular gutter, one of said valve-seats having an annular projection adapted to fit within the gutter, and the other valve-seat having an annular gutter into which fits an annular projection on the valve; substantially as described.

In testimony whereof I have hereunto set my hand this 8th day of October, A. D. 1892.

WILLIAM ROTHOFF.

Witnesses:

H. M. CORWIN,
W. B. CORWIN.