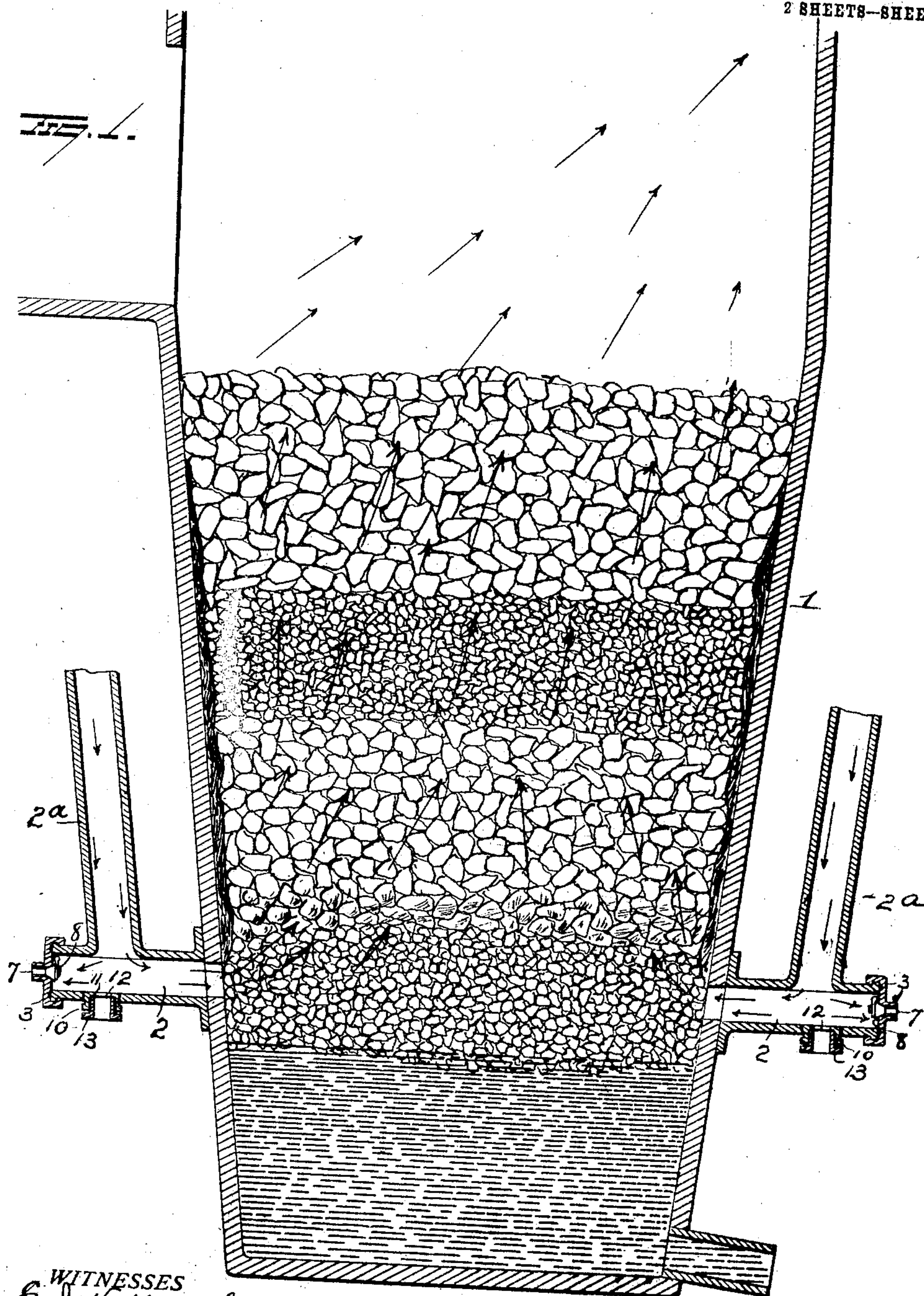


No. 826,715.

PATENTED JULY 24, 1906.

T. EVANS.
BLAST FURNACE TWYER.
APPLICATION FILED DEC. 22, 1905.

2 SHEETS—SHEET 1.



WITNESSES
E. Nottingham
G. F. Downing

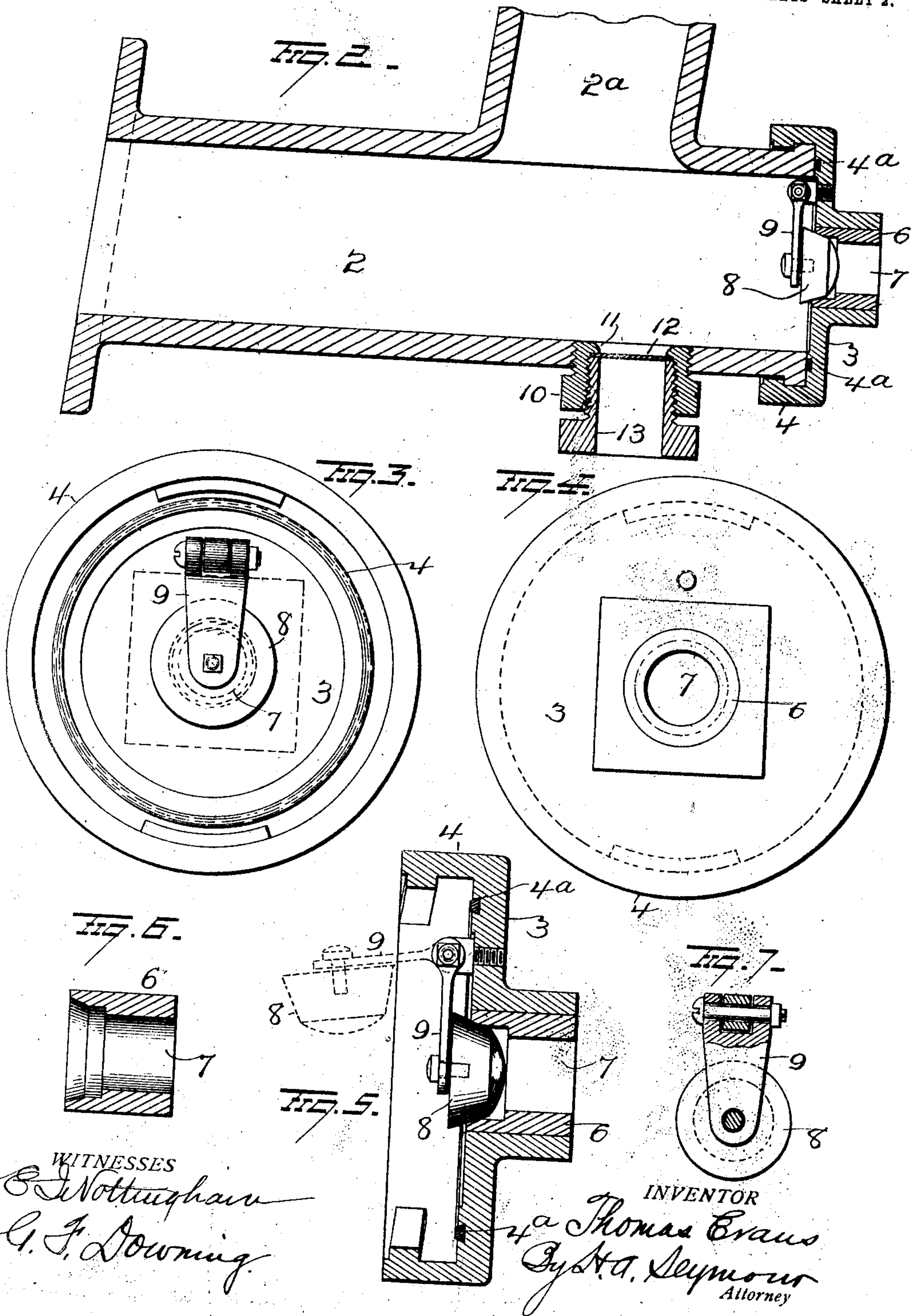
INVENTOR
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2 SHEETS—SHEET 2.



WITNESSES
B. J. Nottingham
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UNITED STATES PATENT OFFICE.

THOMAS EVANS, OF GREAT FALLS, MONTANA.

BLAST-FURNACE TWYER.

No. 828,715.

Specification of Letters Patent.

Patented July 24, 1906.

Application filed December 22, 1905. Serial No. 293,034.

To all whom it may concern:

Be it known that I, THOMAS EVANS, a resident of Great Falls, in the county of Cascade and State of Montana, have invented certain new and useful Improvements in Blast-Furnace Twyers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in blast-furnace twyers, the object of the invention being to provide an improved air-tight twyer with automatic valve to close the punch-rod opening in the end thereof and not interfere with the insertion or withdrawal of the rod, provide improved means for preventing any molten metal which might enter the twyer from reaching the valve, and resulting in a twyer which reduces leakage of air to the minimum, thus rendering the operation of the furnace economical and at the same time, greatly reduces the necessity for close attention to the furnace.

With these and other objects in view the invention consists in certain novel features of construction and combinations and arrangements of parts, as will be more fully hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a view in section, illustrating my improvements attached to a furnace. Fig. 2 is an enlarged view in section of the twyer removed. Fig. 3 is a view of the cap removed, and Figs. 4, 5, 6, and 7 are views of various details of construction.

1 represents a blast-furnace, and 2 my improved twyers secured to the furnace and provided with air-blast tubes 2^a, connected with any blast apparatus. The outer end of the twyer is closed by an air-tight cap 3, which latter has an annular flange 4 to receive the twyer end and be secured thereto by a bayonet or cam joint, and a dovetailed circular groove is made in the cap to receive a packing 4^a, of asbestos or other suitable material, to bear against the end of the twyer and provide a perfect air-tight joint between the cap and twyer.

The cap is made with a central opening or sleeve 5 to receive a brass or other bushing 6, driven tightly therein. This bushing 6 has a cylindrical bore or punch-hole 7, made flared at its inner end to form a valve-seat for a valve 8, which latter is secured upon a link 9,

hinged at its upper end to the cap, as shown, and permits the valve to swing upward out of the way when the punch-rod is inserted and automatically falls and is held tightly closed by the pressure of air when the rod is removed from the twyer.

In the bottom of the twyer a screw-threaded opening is made to receive a tubular plug 10, internally screw-threaded and made with an internal shoulder 11, against which a disk 12, of lead or other fusible metal, is held by a tubular plug 13, screwed into the plug 10.

In the operation of blast-furnaces a quantity of metallic crust forms on the inner surface of the furnace, which when an intense blast of air is supplied to the furnace, often melts and runs down the sides of the furnace into the twyers. Should this occur with my improved twyers, the molten metal will melt the lead disks 12 and run out the opening thus provided without coming into contact with the valve. The operator when he observes the molten metal running out the bottom of the twyer immediately shuts off the blast to that twyer and plugs the same with clay. He then puts in a new lead disk 12, punches out the clay, and turns on the blast, when the twyer is ready for operation as before.

Slight changes might be made in the general form and arrangement of the parts described without departing from my invention, and hence I do not restrict myself to the precise details set forth; but consider myself at liberty to make such slight changes and alterations as fairly fall within the spirit and scope of my invention.

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

1. A twyer for blast-furnaces constructed with an opening in its bottom, a destructible disk normally closing said opening, a removable cap closing the outer end of the twyer, said cap having an opening, and a valve pivotally attached to the inside of the removable cap.

2. The combination with a twyer, of a removable cap thereon having a circular groove, packing in said groove to bear against the end of the twyer, a valve having a hinged connection with the inside of the cap, and a removable bushing in the cap constituting the punch-rod hole the inner end of said bushing forming a seat for said valve.

3. The combination with a twyer having

an opening in its bottom, of a removable cap secured air-tight to the outer end of the twyer, a hinged valve connected with the inside of the cap and closing a punch-rod hole therein, and means for securing a lead disk in the opening in the bottom of the twyer.

5 4. A twyer provided at its rear end with a removable cap having a poke-hole therein and a valve having a hinged connection with

the inner side of said removable cap and normally closing the poke-hole.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

THOMAS EVANS.

Witnesses:

C. C. PROCTOR,
J. A. WRIGHT.