No. 663,177. Patented Dec. 4, 1900.

G. B. KLINK.

TWYER FOR BLAST FURNACES.

(Application filed Mar. 28, 1900.)

(No Model.)

Fig. 1.

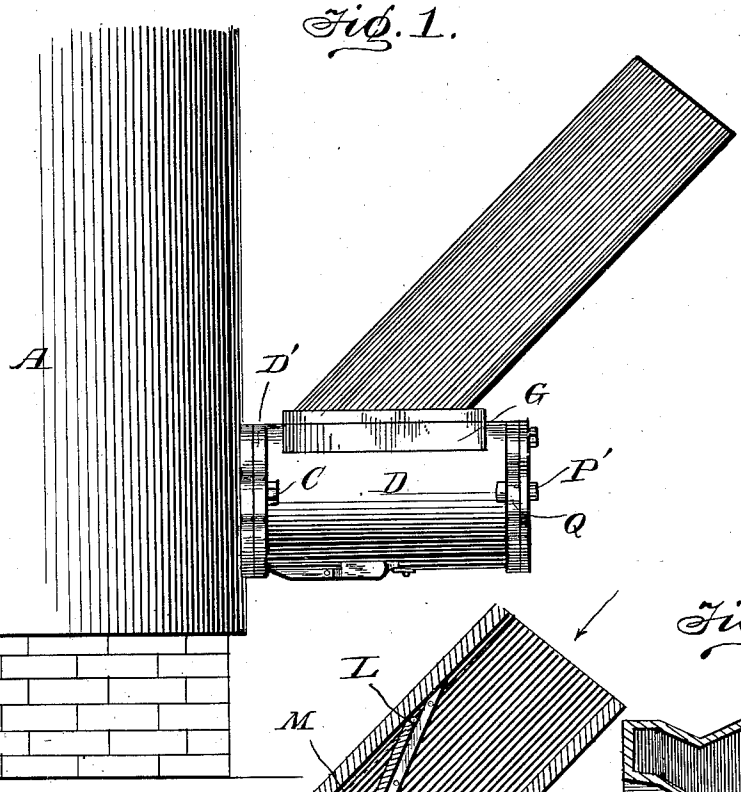


Fig. 2.

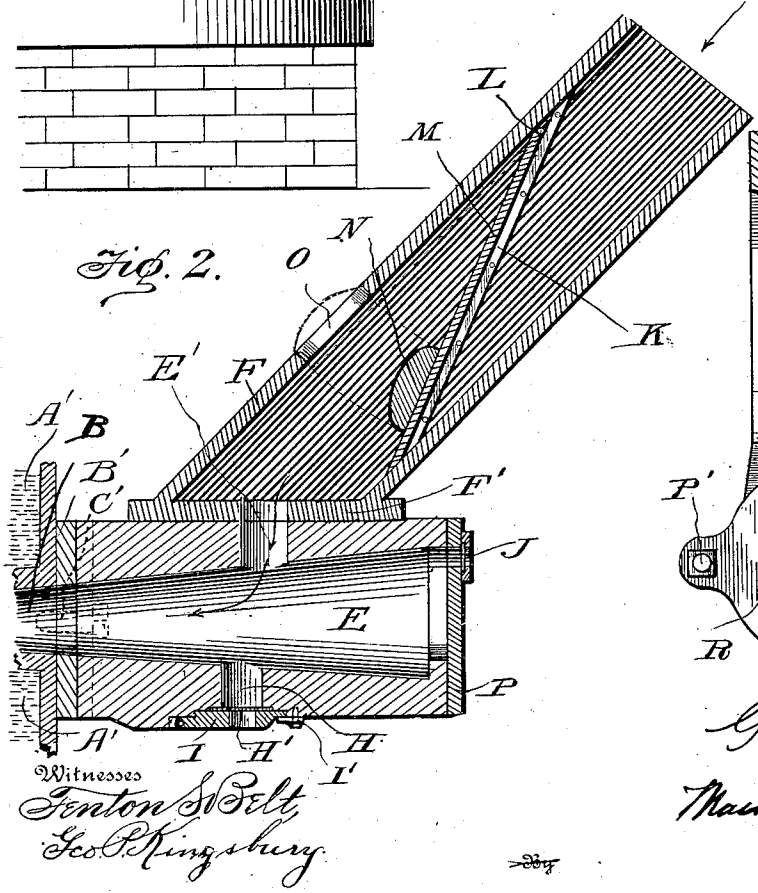
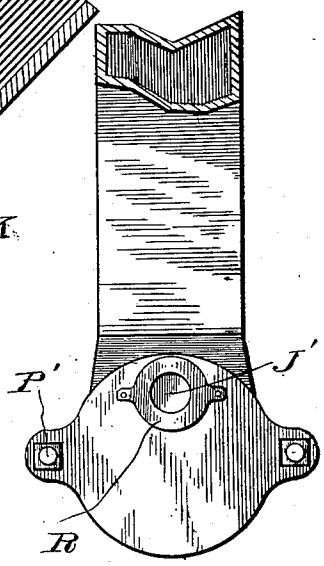


Fig. 3



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UNITED STATES PATENT OFFICE.

GEORGE B. KLINK, OF TACOMA, WASHINGTON.

TWYER FOR BLAST-FURNACES.

SPECIFICATION forming part of Letters Patent No. 663,177, dated December 4, 1900.

Application filed March 28, 1900. Serial No. 10,562. (No model.)

To all whom it may concern:

Be it known that I, GEORGE B. KLINK, a citizen of the United States, residing at Tacoma, in the county of Pierce and State of Washington, have invented certain new and useful Improvements in Twyers for Blast-Furnaces; 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 twyers for blast-furnaces and means for controlling the escape of gas therefrom.

The object of the invention is to provide an improved twyer in which any gas which escapes from the furnace is discharged into the open air and prevented from accumulating in the twyer or blast-pipes.

In the operation of blast-furnaces when the blast is cut off gas from the furnace is liable to accumulate in the blast-pipe, which gas when ignited will explode and cause serious results. Various means have been contrived to prevent these accidents, and with a view to the production of improved means for accomplishing this result my invention consists in the improved construction, arrangement, and combination of devices hereinafter fully described and afterward specifically claimed.

In the accompanying drawings, Figure 1 is a view in elevation of a portion of a blast-furnace, the twyer, and the pipe. Fig. 2 is a vertical sectional view through the same parts, showing, however, less of the furnace than in Fig. 1. Fig. 3 is a front elevation of the twyer and blast-pipe, the furnace being omitted.

Like letters of reference mark the same parts in all the figures of the drawings.

Referring to the drawings by letters, A indicates a portion of any ordinary blast-furnace, preferably of the water-jacket type, the water-space being indicated at A′ in Fig. 2. The furnace is provided with the usual blast-opening or twyer-hole B, and is further provided with a projecting flange or plate B′, rigidly secured to or formed integral with the walls of the furnace and surrounding the twyer-hole. The outer face of the plate B′ is flat and in a vertical plane, said plate being provided with threaded openings C′, as shown in dotted lines in Fig. 2, to receive the inner ends of threaded bolts C, which pass through lateral flanges D′ of the twyer, whereby the twyer may be readily secured to the furnace or removed from it at will.

The twyer is provided with the usual conical opening E, extending from end to end and decreasing in diameter from its outer to its inner end, as shown in Fig. 2, such opening communicating, by means of a vertical channel E′, with the blast pipe or trunk F. This blast-pipe has its lower end closed, with the exception of a central opening registering with the channel E′, by means of a head F′ at substantially an angle of forty-five degrees with the length of the blast-pipe, whereby when said head F′ rests upon the upper face of the twyer the pipe or trunk F will project upwardly and outwardly at about an angle of forty-five degrees from the horizontal length of the twyer.

The twyer is provided with a plate or projection G, flat upon its upper face to receive the flat head F′ of the blast pipe or trunk F, whereby a close joint between these parts is secured. A vertical channel H leads downwardly from the twyer-opening E and is closed at its outer end by a destructible plate or covering H′, held in place by a perforated cap I, hinged to the twyer at one end, and held at the other end, when desired, by means of a turn-button or latch I′. The usual peep-hole J is provided in the outer end of the twyer.

Formed integral with or rigidly secured upon the inner vertical sides of the blast pipe or trunk F are ribs K, extending diagonally from the top to the bottom of said trunk. At L in the trunk is hinged a flat valve M, which, as shown in full lines in Fig. 2, rests upon the ribs K and closes the blast pipe or trunk F against outward escape of gas from the furnace. In its opposite position the valve M lies flat against the upper side or top of the blast pipe or trunk, and a head or button N, secured to the valve, is pressed through an opening O in the top of the blast pipe or trunk.

The outer end of the twyer is closed by means of the head P, held in position against lateral flanges Q on the twyer by means of the bolts P′ passing through said head and

flanges. The peep-hole J is provided with a glass pane J', held in position by the perforated cover R, secured in any usual or well-known manner to the head P.

In the operation of the invention the air-blast passing through the trunk or pipe F will force the valve M into its open position against the top of the trunk or pipe, as shown in dotted lines in Fig. 2, permitting the blast of air to pass through the channel E', the twyer-opening E, and the twyer-hole B into the furnace, the button N at the same time securely closing the opening O and preventing the escape of the blast therethrough. As soon as the blast is cut off the valve M of its own weight, assisted by the weight of the head or button N, will fall to the position shown in full lines in Fig. 2, in which position the trunk or pipe F is closed and the hole O opened, whereby gas passing out from the furnace will be prevented from passing farther into the blast pipe or trunk F or the parts connected therewith and allowing the gas to escape through the opening O. The condition of the contents of the furnace can be ascertained at any time by observation through the peep-hole J, and should slag escape from the furnace it will run through the twyer into the channel H. The slag being in a molten condition will destroy the destructible cover of the channel H and drop to the ground, thus preventing accumulation of the slag in the twyer. When the cover H is destroyed, the blast rushes through the opening H' and makes considerable noise, which warns the attendants of the condition of affairs.

By reason of the construction and arrangement of the various parts, as herein described, all danger of failure of the valve to operate is obviated, the head or button N serving the double purpose of a weight for the valve M and a stopper for the hole O. A twyer constructed as described may be quickly and readily secured to the furnace or removed therefrom, or its outer head may be quickly removed and replaced when desired.

By reason of the construction of my twyer, as hereinbefore described, it is especially adapted for lead-furnaces, for which many of the twyers used for copper and iron furnaces now known cannot be used.

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

The combination with a twyer provided with the usual horizontal opening leading to the furnace and a communicating opening leading up therefrom through the shell, the upper side of the twyer surrounding said opening being flat and horizontal, of an inclined rectangular blast-pipe leading upwardly and outwardly, having an escape-opening in its upper face, and a horizontal lower head or end resting on the flat upper surface of the twyer and provided with an opening registering with the vertical opening of the twyer, straight ribs on the inner sides of the blast-pipe inclining from its top to its bottom face, a flat valve pivoted at its upper end to the inside of the blast-pipe at the upper ends of and above said ribs, and a weighted head or button on the upper face of said valve adapted to normally hold the valve down when closed and to serve as a stopper to close the escape-opening in the upper face of the blast-pipe when the valve is open, substantially as described.

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

GEORGE B. KLINK.

Witnesses:

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