

A. Burtenshaw,

Hot Blast Oven.

No. 101,223.

Patented Mar. 29. 1870.

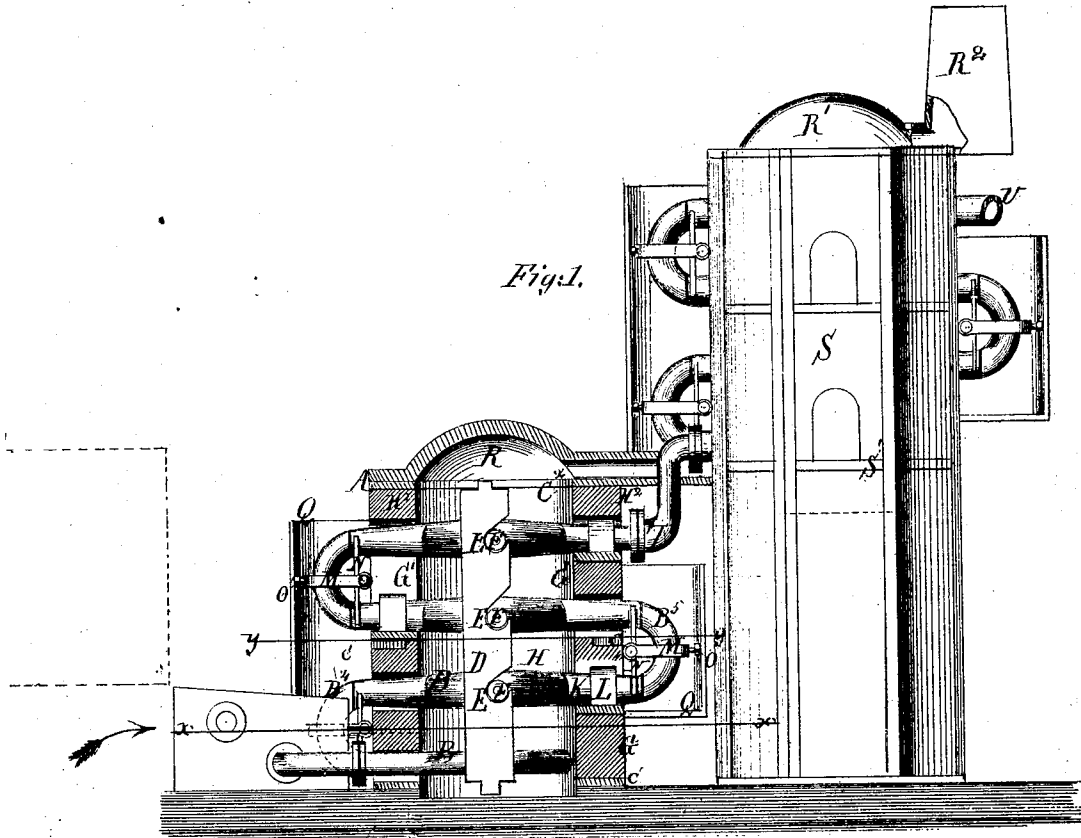


Fig. 1.

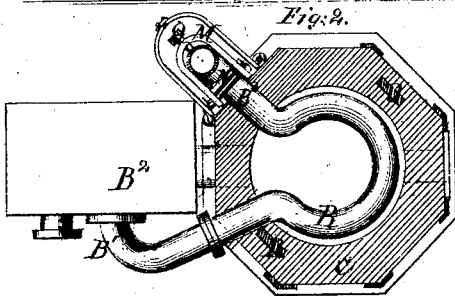


Fig. 2.

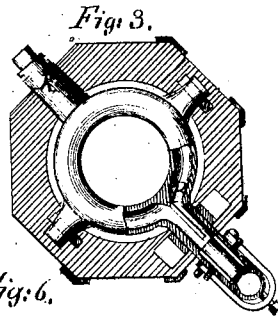


Fig. 3.

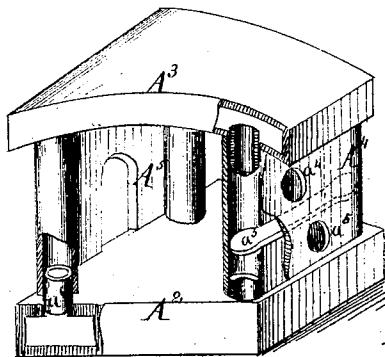
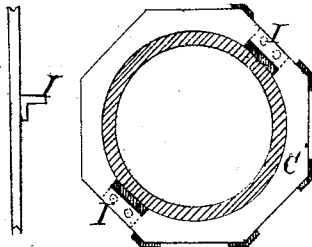


Fig. 5.

Fig. 4^a

Fig. 4.

Fig. 6.



Witnesses
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A. BURTONSHAW, OF HOPE FURNACE, OHIO.

Letters Patent No. 101,223, dated March 29, 1870.

IMPROVEMENT IN HOT-BLAST FURNACES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, A. BURTONSHAW, of Hope Furnace, in the county of Vinton and State of Ohio, have invented a new and useful Improvement in Hot-blast Furnaces; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same, reference being had to the accompanying drawings forming part of this specification.

The object of this invention is to provide a more durable construction and improved arrangement of what are known as ring hot-blast furnaces.

It is also designed to provide an arrangement whereby repairs may be more easily made, and old and worn out rings may be removed.

The invention also comprises an air-heating chest and throat of improved construction.

Figure 1 represents an elevation, partly in section; Figure 2 represents a horizontal section on the line $x x$ of fig. 1;

Figure 3 represents a horizontal section on the line $y y$;

Figures 4, 4^a, and 5, represent detail views; and

Figure 6 represents, in perspective, partly sectioned, my improved air-chest and throat.

Similar letters of reference indicate corresponding parts.

I propose to build the stacks A and S, also the rings B, in sections, and to so arrange the same that any ring may be separately removed for the substitution of others, or for repairs.

To this end I first place a metal ring, C, at the base, and on this I erect two metal posts, D, on opposite sides, with tenons engaging mortises in the said rings.

These posts have at suitable intervals recesses E, for the reception of the hollow trunnions F of the rings. The said recesses have passages leading to them from the edges of the posts, inclining downward to permit of inserting or removing the rings without disturbing the posts. This base-ring is provided with a circular central opening, and the exterior may be either circular or poly-sided.

The first section G of the stack, which is similarly shaped, extends from this base to the point H, where another ring, C', is placed.

This ring rests on brackets I, riveted to the outside of the posts D, which pass through mortises in the said rings, as shown in figs. 4 and 4^a.

The lower tubular heating-ring B, which receives the blast B¹ from the throat B², passes through this section G of the stack, extending nearly around the interior and out at B³ in the same horizontal plane, where it is joined by a vertical return-bend, B⁴, continuing the air-passage to the second ring, B, the latter extending wholly around the interior of the stack, and passing out at the opposite side, where it connects, by a similar return-bend, B⁵, with the next ring

above, and so on for as many rings as it may be required to employ. In a stack where the necks K of these rings pass through the walls, they may be provided with bearings L, such as represented in fig. 5, having flat bases a , to rest on the walls, and circular rings b , with large openings for the necks K, which should fit the said openings snugly. These rings serve to support the arches of the walls to be built over the necks of the rings, and thereby protect them.

In this example the second section G' of the wall extends from H¹ to H², where another plate, O, is placed. This latter, covering the top of the stack-wall, receives tenons on the upper ends of the posts D. These posts may be either wholly within the walls, or they may be bedded on the inside thereof for protection against the heat.

The return-bends joining the necks of the rings are clamped up to the ends of the necks by yokes or clevises M, the pins of which take around plates N, interposed between the necks of the two rings to be united, and so held by flanges or projections on the said necks as to withstand the lateral strain of set-screws O in the outer parts of the yokes, which take around the said return-bends, as clearly shown in the drawings. The said bends are thus clamped up to the ends of the rings in a manner that admits of the ready removal of the said bends.

The receiving ends of these rings are provided with dividing-gates P, which divide the blast and cause it to pass equally both ways through the circular parts.

Q represents hoods for the protection of these bends, which project through the sides of the stacks.

To remove any ring B, the section of the stack between the rings C, C', or C² confining the said ring may be removed, the part of the stack above being supported on the ring C' or C².

To further economize the heat, I make the stacks in two or more divisions, side by side, one division taking the burning gases at the bottom from the top of the other, the said gases being conveyed laterally from the one to the other, first being acted on by reflecting-domes at the tops of the divisions from which they are passing, each division being similarly provided with heating-rings, which are thus more intensely acted upon by the heat than where all the rings are placed in a single straight stack, through which the heat escapes more rapidly.

R represents the reflecting-dome of the first division, by which the heat rays are thrown back upon the rings to a great extent.

S represents the second division, the foundation of which extends to S', as high as the top of the first division. From this point upward is a similar construction and arrangement of heating-rings.

T represents the pipe-connection between the rings of the one and the other.

In this example only two divisions are shown.

As another method of economizing the heat, I provide a reflecting-dome, R¹, on the top of the last division, and convey the heat or gases therefrom in a lateral direction to the final discharging-flue, as shown at R².

From the top of the last division any suitable pipe-connection may be made at U for conveying the heated blast to the furnace.

I propose to introduce between the furnace and the first division of the stack an air-heating chamber or throat, B², arranged in the following way:

I make top and bottom plates A² A³ of hollow cast metal, also sides A⁴ A⁵ in a similar way.

The side A⁴ has a horizontal partition, a³, receiving-hole a⁴, and discharging-hole a⁵.

These sides are arranged vertically between the base A² and top A³, and circular passages, provided with thimbles a⁶, are made in the said bottom and top, and in the ends coinciding therewith, making a continuous passage from the receiving-hole, around the throat, to the discharging-hole a⁵, where the pipe-connection B of the rings B is made.

The receiving-hole a⁴ is connected with the fan or other blowing device, and the cold air is passed through this air-heating chamber at the commencement of the heating process.

This apparatus performs three offices: first, assisting to heat the air; second, acting as an air-chamber to regulate the blast; and, third, preserving the fire-throat against the action of the heat thereon.

I am aware that a patent for a blast-furnace was

granted to P. and R. Hoop on the 27th of October, 1868, and all devices therein shown I wish to distinctly disclaim as part of my invention.

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

1. A furnace-stack formed in sections with the intermediate parts independently supported, so that any one may be separately removed.

2. A furnace-pipe to transmit hot-air, composed of horizontal and curved sections, as shown and described.

3. The combination in a hot-blast furnace of a heating-throat, reflecting-domes, and successive stacks, all co-operating to intensify the heat of the blast in the manner described.

4. Sustaining the hot-air pipe firmly but detachably by means of trunnions F and post D, having open inclined recesses E therein, as shown and described.

5. Supporting the sections of a furnace-stack by means of annular plates C C¹ C², brackets I, and posts D, arranged and adjusted in the manner described.

6. Attaching the "return-bends" B⁴ B⁵ by means of yokes M, plates N, and set-screws O, to the horizontal sections, so to form a detachable joint in the manner described.

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Witnesses:

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