

J. PLAYER.
Hot Blast Oven.

No. 103,651.

Patented May 31, 1870.

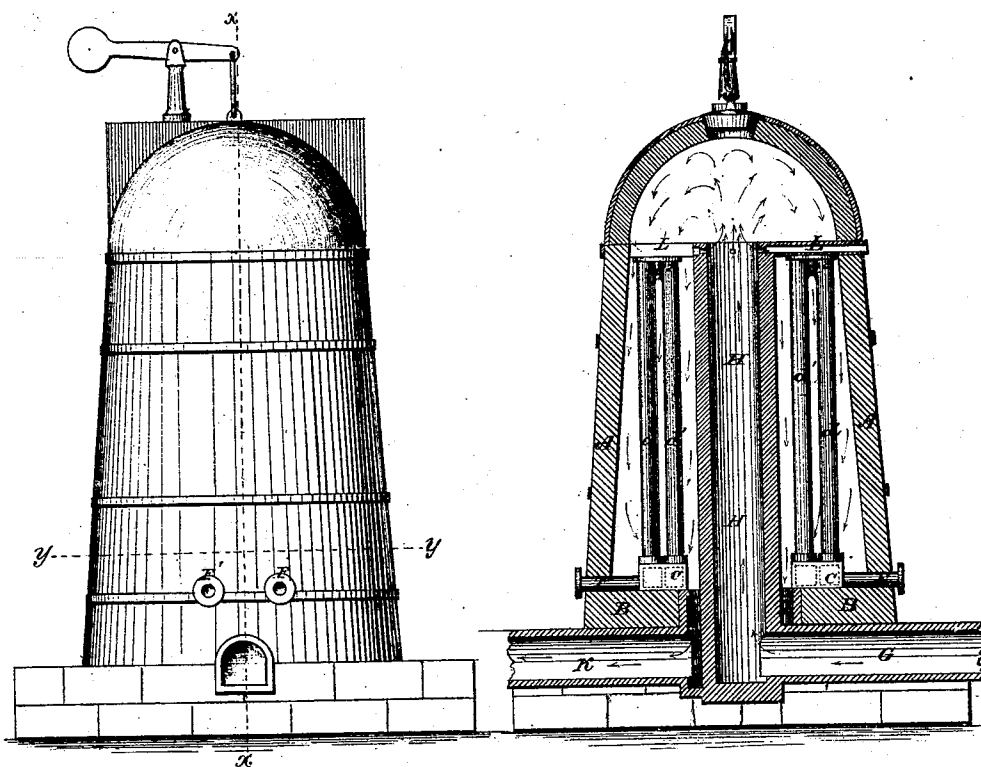
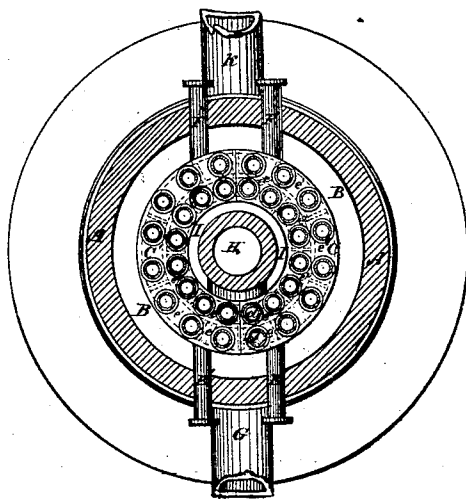


Fig. 3



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AUGUSTA AMELIA PLAYER AND HENRY McALLISTER, JR., OF PHILADELPHIA, PENNSYLVANIA, ADMINISTRATORS OF JOHN PLAYER, DECEASED.

Letters Patent No. 103,651, dated May 31, 1870.

IMPROVEMENT IN HOT-BLAST OVENS.

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

To all whom it may concern:

Be it known that JOHN PLAYER, deceased, sometime of Norton, near Stockton-on-Tees, in the county of Durham, in England, and a subject of the kingdom of Great Britain, late of the city and county of Philadelphia, in the State of Pennsylvania, was in his lifetime the inventor of certain new and useful Improvements in Hot-Blast Ovens, of which improvements the following is a specification.

The invention herein specified is more especially designed for and adapted to charcoal furnaces blown by ventilators or fans, and its objects are to secure durability, cheapness in construction, large area of heating-surface in comparison with the weight of metal employed, large sectional area of the blast heating-pipes, non-liability to get out of order, and economy in heating the pipes, with a comparatively small consumption of gases, by insuring their more perfect combustion.

The improvements herein claimed consist—

First, in combining with the oven a central flue, through which the hot gases are conducted into the oven above the pipes in which the blast is heated, instead of being discharged directly against the bottom of these pipes, as heretofore has been the rule.

Second, in combining with the upper part of said central flue, pipes which extend outside of the oven, and through which atmospheric air is blown or drawn into the central flue, the air thus blown or drawn in, becoming heated during its passage to the central flue, and there being mingled with the heated gases passing up the flue into the chamber above it, causing said gases to burst into flame at this point and produce an intense heat.

Third, in combining with the central flue, an exit-flue, arranged below the blast-chests, so as to draw the flame and exhausted gases downward among the air-heating pipes, and discharge them beneath the blast-chests into the chimney.

Fourth, in combining with the central flue, a series of blast-heating pipes, and suitable blast-chests, arranged around said flue, as hereinafter described.

Fifth, in combining with a central flue, which discharges the hot gases into a chamber in or near the top of the oven, blast-heating siphon-pipes, having their tops covered with fire-brick, or other refractory material, to prevent the burning of the pipes by the direct impingement of the burning gases.

Sixth, in combining an oven having a combustion-chamber at its top, a central flue discharging hot gases into said chamber, air-pipes passing through said oven, and discharging atmospheric air into said flue near its top, blast-heating siphon-pipes arranged around said central flue, and an exit-pipe or flue for

the products of combustion, arranged beneath the blast-chests, for the purposes hereinafter set forth.

In the accompanying drawing of the improved oven herein claimed—

Figure 1 is an elevation;

Figure 2, a vertical central section through the line $x x$ of fig. 1; and

Figure 3, a horizontal section through the line $y y$ of fig. 1.

The shell A of the oven rests on a base, B, which also supports the blast-chests O O', into which the blast heating-pipes are inserted.

These pipes are of a peculiar form, each pipe being composed of two straight tubes $d d'$, connected at top by a box, d^2 , fig. 2, of a sectional area greater than that of the tubes. By this mode of construction, the box serves to alter the direction of the current of air flowing through the pipes, and also enables the constructor to use straight tubes, which is an advantage, as these tubes can be cast vertical, and with the core-barrel projecting at each end, as water-pipes are usually cast, which process insures a uniform thickness of metal throughout the tubes, and thus renders them more durable than if made of varying thickness.

The tops of these boxes are covered with slabs of fire-brick, or other like refractory material, for which arrangement their flat surface affords great facility, and the boxes are thus protected against injury from the intense heat to which they are subjected.

The blast-chests O O' are respectively semicircular segments of two annular troughs or boxes, rectangular in their cross-sections.

Each chest is divided by a vertical partition into two compartments or chambers concentric with the central flue.

They are likewise divided respectively by vertical transverse partitions into sections or compartments $e^1 e^2$, as shown in fig. 3.

With these chests the tubes or siphon blast-pipes are connected by the well-known spigot and faucet joints, and caulked with iron rust-joints, the relations of the respective legs of each of the siphons to the respective compartments of each of the chests being, as is usual, such that the traverse of the blast may be through the tubes in the ordinary manner, for example, as shown in this instance, the blast enters the blast-chests through pipes E E', and passes through the compartment e^1 into and up the tubes d into the boxes d^2 , and thence down the tubes d' into the compartment e^2 of the blast-chests, whence it again ascends, other tubes opening into that compartment, and again descends into the compartment in which the next tubes open, and so passing through all the pipes of its series, is finally conducted from the blast-

chest to the furnace in the ordinary manner through the pipes F F', fig. 3.

Although only two distinct sets of blast-chests and pipes are shown in the drawing, it is obvious that their number may be multiplied, if requisite.

The gas by which the oven is heated, is conducted from the blast furnace through the flue G, and ascends a flue, H, arranged centrally within the oven. This flue extends from the bottom of the oven up to or above the level of the top of the pipes *d d'*, as shown in fig. 2.

As the heated gases are about to escape from this flue into the combustion-chamber, they are mingled with atmospheric air blown or drawn in through pipes L, passing through the walls of the oven and entering the flue near its top.

These pipes may be inclined upward, so that the air escaping from them may create a strong upward draught in the flue.

As the pipes L pass through the oven, the air entering the flue becomes highly heated. This mingling of air with the gases causes them to burst into flame immediately above the flue, and, flashing out against the top of the combustion-chamber, the flames are reverberated downward upon and among the pipes, which are thus highly heated.

The dome-shape of the combustion-chamber, together with the velocity with which the ascending current moves, causes the flame and gases to descend close to the walls of the oven, as well as to fill the space around the pipes until they are eventually drawn between the inner rows of pipes into an annular chamber, I, surrounding the central flue, and thence escape into a proper chimney through a flue, K, beneath the blast-chests.

It is purposed sometimes, if found necessary, to ignite the gases at the bottom of the central flue H by fire, the combustion of which may be supported by the admission of a jet of air. The gases, however, would not become fully inflamed until mingled with the blast of air at the top of the flue, as hereinbefore described.

What is claimed as the invention of the said JOHN PLAYER is—

1. The combination, with the oven, of the central flue, conducting and discharging the hot gases into the upper part of the oven, substantially as set forth.

2. The combination, with the central flue, of the air-pipes near its upper end, substantially as hereinbefore set forth.

3. The combination of the central flue, the blast heating-pipes, and the exit-flue, substantially as hereinbefore set forth.

4. The combination, with the central flue, of the blast-chests and blast-heating pipes arranged around said flue, substantially as hereinbefore set forth.

5. The relative arrangement of a central flue, siphon-blast heating-pipes, and fire-brick, or like refractory material, to protect the tops of the pipes from injury, as described.

6. The combination of the central flue, the combustion-chamber, the air-pipes, the blast heating-pipes, and the exit-flue, substantially as hereinbefore set forth.

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Witnesses:

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