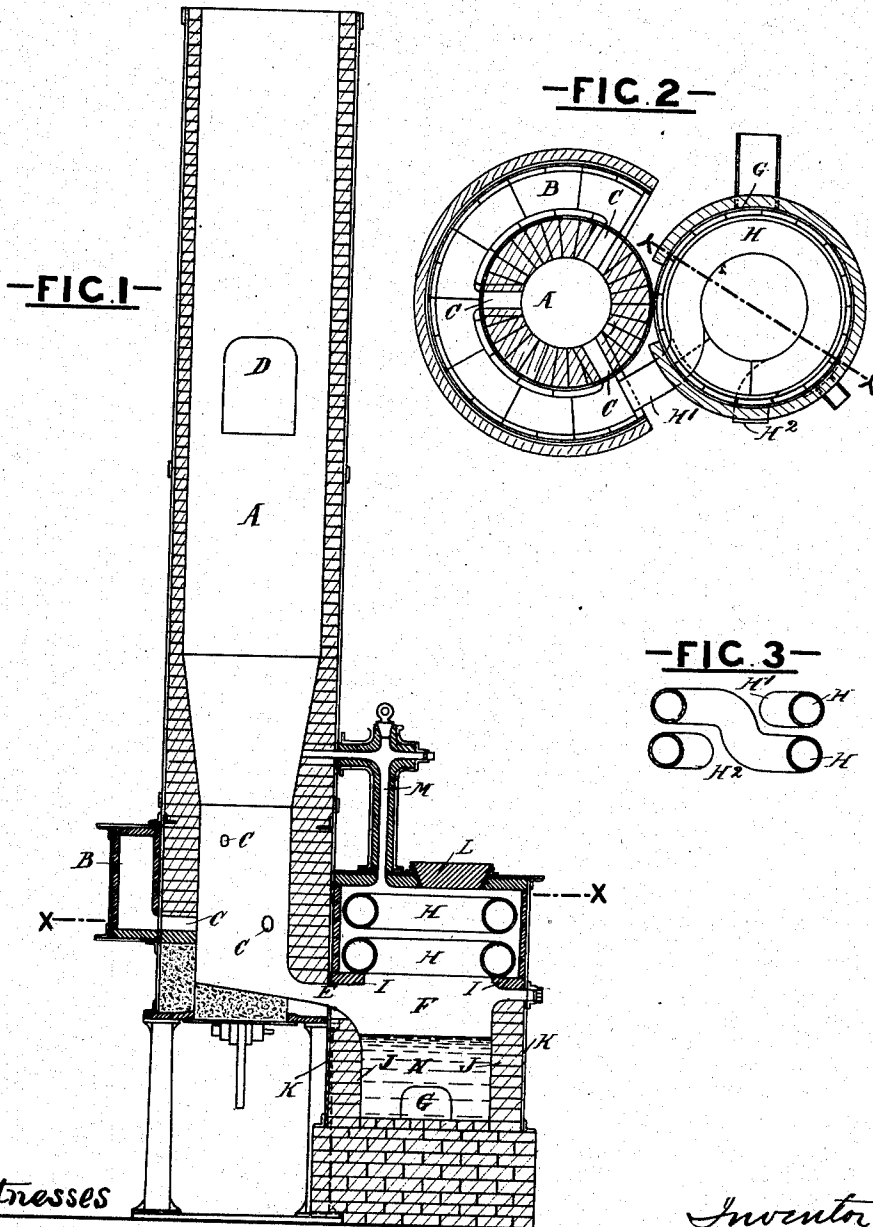


(No Model.)

A. P. RUSHFORTH.
CUPOLA OR BLAST FURNACE.

No. 509,450.

Patented Nov. 28, 1893.



Witnesses

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UNITED STATES PATENT OFFICE.

ALEXANDER PERCY RUSHFORTH, OF CANNING TOWN, ENGLAND.

CUPOLA OR BLAST FURNACE.

SPECIFICATION forming part of Letters Patent No. 509,450, dated November 28, 1893.

Application filed March 14, 1893. Serial No. 465,911. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER PERCY RUSHFORTH, engineer, a subject of the Queen of Great Britain, residing at 181 Barking Road, Canning Town, in the county of Essex, England, have invented certain new and useful Improvements in or Relating to Cupolas or Blast Furnaces, of which the following is a specification.

The object of my invention is to provide improved means of heating the air blast before admitting the same to the cupola or blast furnace. For this purpose I employ, in connection with the cupola or blast furnace, a receiver into which the molten metal runs as it is produced in the cupola or blast furnace, and in the interior of this receiver and above the surface of the molten metal contained therein, I place one or more pipes or rows of pipes and connect such pipes at one end with the main blast pipe from the blowing machine or blowing engine, and the other end with the air belt or pipe leading to the tuyeres of the cupola or blast furnace. The pipes in the aforesaid receiver become highly heated, partly by contact with the hot gases contained in or passing through the receiver, and partly by heat radiated from the molten metal, and the blast of air becomes correspondingly heated in its passage through the aforesaid heated pipes in the receiver.

In the drawings hereto annexed Figure 1 is a vertical section of a cupola with my improvements applied thereto and Fig. 2 a horizontal section taken on line X X of Fig. 1.

A is the body of the cupola constructed in the usual way, B the air belt, C the tuyere holes for the admission of air from the belt B to the interior of the cupola.

D is the usual charging opening and E a passage through which the molten metal flows from the bottom of the cupola.

F is the receiver above mentioned into which the molten metal flows from the opening E.

G is the tapping hole through which the molten metal can be withdrawn from the receiver F as and when required.

H is a coil of pipe which may be of cast iron or any other suitable material adapted to bear the great heat to which it is subjected.

This coil of pipe is supported in the upper part of the receiver F by bearers I, or in any other convenient and suitable way. The end H' of the coil of pipe H is connected to the air belt B and the other end H² to the main blast pipe of the blowing machine or blowing engine.

Fig. 3 is a section of the pipe H taken on line Y Y of Fig. 2 looking in the direction of the arrow, showing the connection between the upper and lower coils of the pipe.

The lower part of the receiver F containing the molten metal may be constructed of fire brick J bound together by an iron casing K. The upper part may consist of a continuation upward of the iron casing K lined with fire-brick or ganister for example and covered with slabs of fire clay. An opening is preferably made in the top for convenience of access to, or examination of, the pipe H or of the receiver. This opening may be closed with a fire clay plug L. The hot gases which escape through the opening E into the receiver F are by preference returned to the cupola at a convenient point by means of a pipe M.

It will now be understood that when the cupola is at work, the pipe H will be highly heated first by the hot gases escaping from the lower part of the cupola through the opening E and passing back to the cupola through the pipe M, and secondly by heat radiated to it from the molten metal N collected in the lower part of the receiver F, and that the air blast, in its passage through the said pipe H on its way from the blowing machine or blowing engine to the air belt B, will be highly heated by contact with the heated sides of the said pipe H.

It will be obvious that the invention can be adapted to a blast furnace by suitably modifying the arrangements above described and illustrated in the drawings of a cupola but the length of the pipe H should be much greater for a blast furnace than for a cupola. This increased length may be obtained by making the upper part of the receiver higher and increasing the number of coils of the pipe contained in it. And it will be understood that whether applying the invention to a cupola or to a blast furnace, I do not confine myself

to the coiled form of the pipe H as the same may be arranged in any way that may be most convenient or suitable; for example the said pipe may be composed of a series of vertical or inclined pipes of any suitable height
5 connected together by U shaped bends at top and bottom so as to form a continuous serpentine or zigzag pipe arranged around the interior of the upper part of the receiver F.

10 The receiver F is shown of circular form in plan but it may be made of square, octagonal or any other shape as may be found most convenient.

15 I am aware that it is not new to employ receivers in connection with cupolas and blast furnaces to receive and contain the molten metal therefrom, and I make no claim to the use of such receivers except when employed in connection with a pipe or pipes for heating

the air blast in accordance with my invention.

I claim—

In a cupola or blast furnace the chamber A, the receiver F connected with the chamber A, the air belt B about the chamber A, the tuyeres
25 C, the air blast pipe extending through the upper part of the receiver and connecting with the air belt, and the passage M, leading from the top of the receiver above the blast pipe to the chamber A, substantially as described.

In testimony that I claim the foregoing as my invention I have signed my name in presence of two subscribing witnesses.

ALEXANDER PERCY RUSHFORTH.

Witnesses:

STEPHEN EDWARD GUNYON,
WILLIAM ANDERSON SMITH.