May 17, 1927. 1,629,045

J. A. PARKER

BLAST FURNACE

Filed July 7, 1925 2 Sheets-Sheet 1

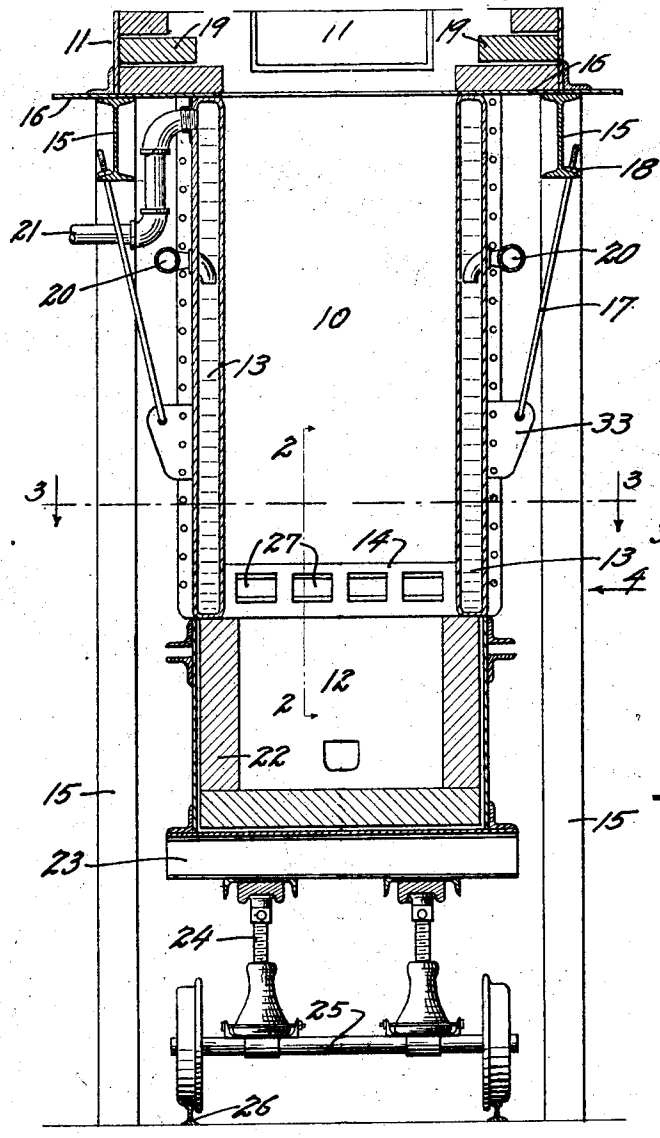


Fig 1

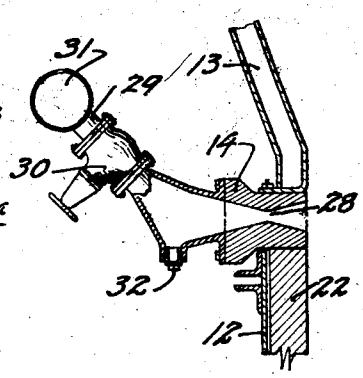


Fig 2

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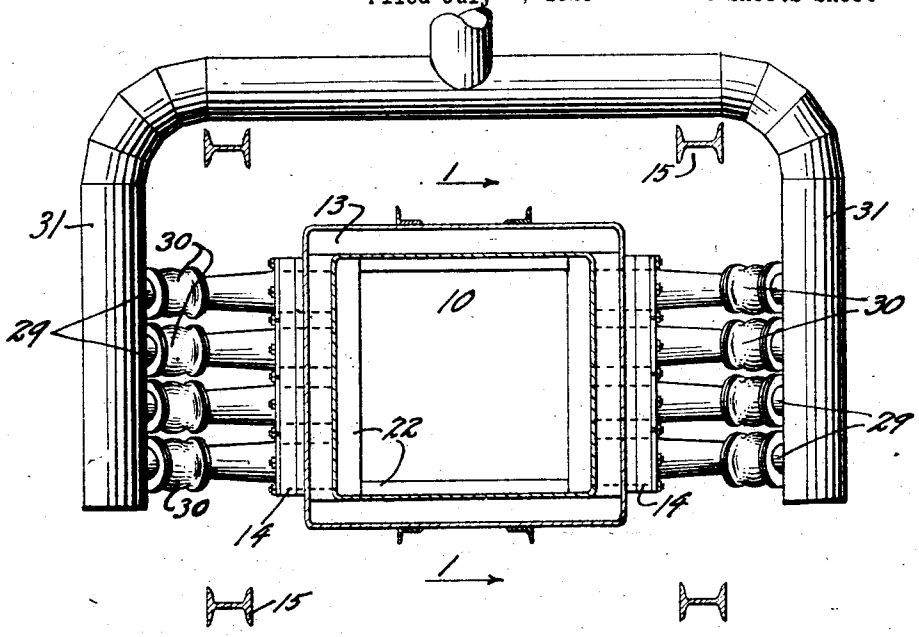


Fig 3

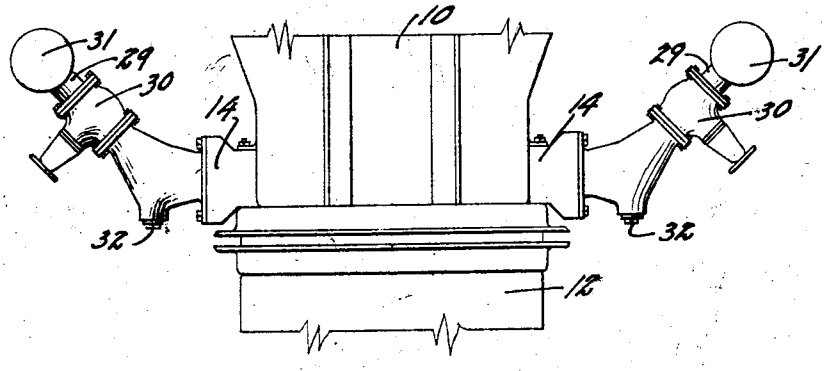


Fig 4

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Patented May 17, 1927. 1,629,045

UNITED STATES PATENT OFFICE.

JOHN A. PARKER, OF RIFLE, COLORADO.

BLAST FURNACE.

Application filed July 7, 1925. Serial No. 41,952.

This invention relates to blast furnaces and has for its principal object the improvement of the method and apparatus for introducing the air blasts to the furnace so that cold spots or cakes will be avoided and a complete and uniform melt obtained.

Another object is to so construct the furnace that the water jacket which surrounds the furnace will extend throughout the entire furnace so that all surfaces which are not cooled by the air blast will be cooled by the circulating water.

Still another object is to provide a novel means for mounting the furnace shaft and crucible so that tight joints will at all times be maintained both between the shaft and the charging top and between the shaft and crucible.

Other objects and advantages reside in the detail construction of the invention, which result in simplicity, economy, and efficiency, and which will become more apparent from the following description.

In the following detailed description of the invention reference is had to the accompanying drawings which form a part hereof. Like numerals refer to like parts in all views of the drawings and throughout the description.

In the drawings:—

Fig. 1 is a vertical section through my improved blast furnace taken on the line 1—1, Fig. 3.

Fig. 2 is a detail view showing a vertical section through the twyer block, taken on the line 2—2, Fig. 1.

Fig. 3 is a horizontal section through the furnace, taken on the line 3—3, Fig. 1.

Fig. 4 is a fragmentary side elevation of the lower part of the furnace, looking in the direction of arrow 4, Fig. 1.

The furnace comprises a shaft 10, above which, is arranged a charging head 11, and which is suspended over a crucible 12.

The shaft 10 is completely surrounded by a water jacket 13 which extends, on two sides, entirely to the bottom thereof into contact with the crucible 12. On the other two sides, the water jacket 13 terminates above, what will be designated, a twyer block 14. The lower face of the twyer block 14 aligns with the lower extremities of the water jacket 13 to form the bottom edge of the shaft. Water flows into the jacket through suitable inlet pipes 20 and discharges through an outlet pipe 21.

The shaft 10 is supported from a suitable framework 15 which carries a top plate 16, having an opening corresponding to the interior opening of the shaft. The upper edge of the shaft 10 is clamped tightly against this plate 16 by means of threaded hangers 17 which are attached to suitable plates 33, on the shaft, and pass through openings in the supporting frame 15 in which they are held by suitable nuts 18. The charging head 11 is lined with the usual fire brick lining 19, which is brought out to the opening in the plate 16.

This method of supporting the shaft has been found to be very efficient since all attachment means are kept well away from the heated zone and, since the furnace is freely suspended on the hangers 17, it can be drawn tightly against the plate 16, and will adjust itself thereto, by the nuts 18. This also allows the water jacket 13 to be continued up to the very top of the furnace where it is replaced by the fire brick lining of the charging head 11.

The crucible 12 contains the usual fire clay lining 22, and is carried on a frame 23 mounted on jack screws 24 carried on a wheeled truck 25. This method of mounting enables the crucible to be firmly clamped against the furnace bottom without disturbing the track 26 upon which the truck 25 travels.

It is desired to call attention to the fact that the water jacket extends to the very bottom of the furnace on two sides until replaced by the fire clay lining 22 of the crucible. On the remaining two sides the jacket contacts with twyer block 14 which in turn contacts with the crucible. The twyer block 14 is cooled by the incoming air blast so that from charging head to crucible no uncooled metal is exposed and the life of the furnaces is greatly increased.

Each twyer block 14 extends entirely across the furnace and contains a series of independent twyers 27 of unusual design. These twyers 27 have a vertically restricted portion 28 from which they again open outward to a relatively large orifice at the discharge. This construction causes the blast to be projected straight forward from the twyers but at the same time spreads the blast vertically in a wide fan-shaped spray. The twyers of the opposite twyer block are oppositely placed so that the sprays will meet and be thrown to all parts of the furnace.

This construction forces the air equally to all parts of the furnace and eliminates the usual cold spots or twyer cakes found where the air is blown through a straight nozzle. Each twyer 27 is provided with one of the usual fusible slag plugs 32.

Each of the twyers 27 is fed by a separate blast pipe 29, each controlled by an independent valve 30, and fed from a common blast header 31.

This system allows the air to be controlled very accurately so that the distribution in the furnace may be regulated to avoid blow holes in the furnace bed and a uniform blast obtained throughout the bed regardless of its condition.

While a specific form of the improvement has been described and illustrated herein, it is desired to be understood that the same may be varied, within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what I claim and desire secured by Letters Patent is:—

1. In a blast furnace having a surrounding wall, the lower edge of said wall comprising a series of blocks separated by water spaces, said blocks extending entirely through the width of said wall and having their lower faces in alignment with the lower faces of said water spaces; and a series of air passages through each of said blocks to the interior of said furnace.

2. In a blast furnace having a surrounding wall, the lower edge of said wall comprising a series of blocks separated by water spaces, said blocks extending entirely through the width of said wall and having their lower faces in alignment with the lower faces of said water spaces; and a series of air passages through each of said blocks to the interior of said furnace, said passages being of less vertical width at the center line of said blocks than at the faces thereof, the horizontal width of said passages being equal through the thickness of said block.

In testimony whereof, I affix my signature.

JOHN A. PARKER.