

(No Model.)

2 Sheets—Sheet 1.

J. P. WITHEROW.
BOSH PLATE.

No. 572,143.

Patented Dec. 1, 1896.

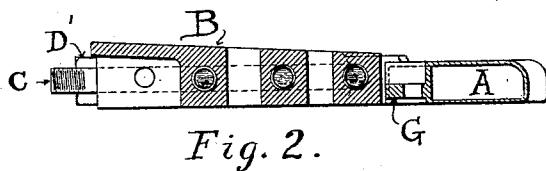


Fig. 2.

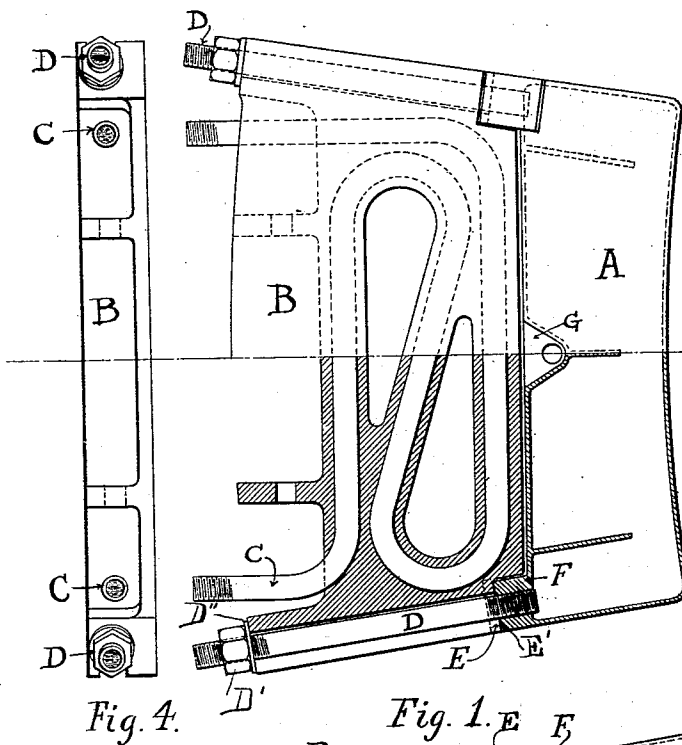


Fig. 1.

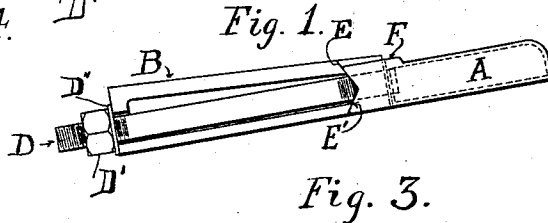


Fig. 3.

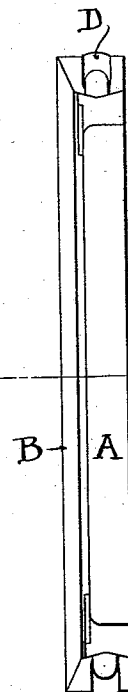


Fig. 5.

WITNESSES:
Minor Scoore
L. Schmidt

INVENTOR
J. P. Witherow

UNITED STATES PATENT OFFICE.

JAMES PORTER WITHEROW, OF PITTSBURG, PENNSYLVANIA.

BOSH-PLATE.

SPECIFICATION forming part of Letters Patent No. 572,143, dated December 1, 1896.

Application filed March 31, 1896. Serial No. 585,524. (No model.)

To all whom it may concern:

Be it known that I, JAMES PORTER WITHEROW, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Bosh-Plates, of which the following is a full, clear, and exact description.

Devices of various sorts have long been used in blast-furnace practice for the purpose of preventing the wearing away of the bosh-walls. Of these devices one general type has been persistent and is known in the art as the "bosh-cooling-plate" system. This system has become indispensable for the protection of the brick in the bosh-walls against the great exactions imposed by the continuously-increased output of the modern high-power blast-furnace. It has consisted, usually, of a series of metal plates or hollow boxes cooled with air or water, or both, and built into the brickwork of the bosh-wall in more or less continuous circles or rows and often supported by crinoline bands. The plates as first used were generally made in the form of cast-iron blocks with an embedded coil of pipe, and sometimes were made wedge-shaped for easy removal. Later designs have consisted of tapered hollow boxes made of bronze or various other costly alloys, to the surface of which the semimolten or liquid stock adheres little or not at all and which are heavy and expensive, owing to the large first cost of the constituent metals.

The object of my invention is to increase the efficiency and convenience of the bosh-plate while reducing its costs; and, briefly stated, it consists, first, in forming the water-cooled plate with a removable water-cooled nose, and, second, in making the water-cooled nose of the plate of bronze or equivalent alloy or metal and the water-cooled body of iron or other cheaper metal.

The following description of my invention, together with the drawings herewith, is sufficiently full and clear to enable one skilled in the art to make and use the same; and in the drawings similar letters refer to similar parts throughout.

My improved bosh-cooling plate consists of two parts, a separable water-cooled nose-piece A, preferably made of bronze or other suitable alloy or metal, and a body-piece B,

cast or forged, preferably out of iron or other cheaper material, which may be cooled by water, either through open or closed channels or by means of pipe-coils placed or cast therein or used in connection therewith. It is preferably made prismoidal, with the inner end smaller than the outer to permit easy withdrawal.

Figure 1 shows a construction of the plate with separable nose A and body B large, the latter made of cast-iron with a pipe-coil embedded therein and an air-cooling space next to its outer edge. Figs. 2, 3, 4, and 5 show various views and sections of the same construction. Figs. 6 and 7 show the separable nose A and a forged body B arranged for air-cooling. Figs. 8 and 9 show the separable nose A and a forged body B arranged with pipe-coil C for water-cooling the latter. Figs. 10 and 11 show the separable nose A and a forged body B arranged for water-cooling by the use of the supplementary hollow plate H.

The supplementary plate H may be water-cooled either by means of a channel, as shown, or by pipe-coils.

It is an especial and peculiar advantage of the type of my plate shown in Figs. 6 to 11, inclusive, that if the nose A becomes suddenly useless by leakage or otherwise the pipes D may be unscrewed therefrom, the nose separated from the body and pushed inwardly through the brickwork into the furnace, and a supplementary plate, such as H, pushed forward to replace it temporarily until such time as the body B can be withdrawn conveniently and a new nose attached thereto and the combined plate replaced as a whole.

The nose A preferably has upon it the lug G, and is fastened to the body B by the pipes D, with their nuts D' and washers D², which act as stud-bolts, and it is centered and supported by a recess, such as E', in one part and a corresponding projection E on the other.

When the nose A is to be removed and cannot easily be pulled out while still attached to the body B, the nuts D' on pipes D are removed, the body B withdrawn, a hook inserted into the hole in lug G and hauled up tight, when by shaking the nose A a little at

either end the clay packing which surrounds it will be cracked and the nose easily pulled loose from the clay and brickwork.

It is evident that any well-known mechanical equivalent may be substituted for the lug G, pipes D, and nuts D' without departing from the spirit of my invention, the parts being described as typical only and not essential. Neither is it necessary to construct the projections E and their corresponding recesses E' of the precise form shown to provide for the centering and supporting of the nose-piece A. The letters and terms used in the claims are intended to cover any mechanical equivalents for attaching the parts together and permitting their convenient withdrawal from the brickwork. The term "bronze" is used in the claims generically and is intended to cover any metal or alloy to whose cooled surface hot liquid or semi-molten stock adheres little or not at all. It is also evident that these plates may be connected together through their inlet and outlet water-pipes in various manners other than that specifically described herein, as will be evident to those skilled in the art, without departing from the spirit of my invention.

While the ability to use bronze in the construction of the nose A with a cheaper material for the body B is one of the advantages of my invention, I do not limit myself thereto, so far as concerns the broad idea of a separable nose, but wish to cover the latter, whatever may be the metal or alloy used in the construction of either of these parts. Thus both nose and body may be made of bronze, if desired, or they may either or both be made of any other suitable material. Nor do I limit myself to the use of the above-described plates in the bosh-walls of an ordinary blast-furnace, but intend to cover their use in any furnace the walls of which are exposed to the action or contact of hot semimolten or liquid material at a high temperature.

In the claims I have used the word "channels" to describe the compartments or pas-

sages for the water or cooling medium, and I desire by this term to be understood as meaning any suitable form of channel or pipe-coil such as described.

What I claim as new and of my invention, and desire to be secured to me by Letters Patent of the United States, is—

1. A bosh-cooling plate consisting of a body B and a separable nose A, both of which are formed or provided with channels and means for passing water through the same for cooling them, as set forth.

2. A bosh-cooling plate consisting of a body B and a separable nose A, both of which are formed or provided with channels and means for passing water through the same, the nose being composed of bronze, and the body of a cheaper material, as set forth.

3. The combination in a bosh-cooling plate, of a body B provided with channels for the passage therein of water, with a separable nose A, also provided with a water-chamber, and water-pipes D connected with the nose A and securing the same to the body B, as described.

4. The combination in a bosh-cooling plate of the body B, the detachable nose A formed with a water-channel, the water-pipes D and nuts D' thereon for securing the nose to the body, the said body and nose being formed with a projection E on one and a recess E' on the other for centering and supporting the nose, as described.

5. In a bosh-cooling plate, the combination of the hollow body B, the hollow separable nose A, means for passing water through said nose, and a supplementary withdrawable cooling device contained in the body B and provided with means for maintaining a circulation of water through the same, as set forth.

In testimony whereof I have hereunto set my hand.

JAMES PORTER WITHEROW.

Witnesses:

THOMAS B. KERR,
MINOR SCOVEL.