

UNITED STATES PATENT OFFICE.

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FOREHEARTH-JACKET FOR BLAST-FURNACES.

SPECIFICATION forming part of Letters Patent No. 515,083, dated February 20, 1894.

Application filed July 20, 1892. Serial No. 440,587. (No model.)

To all whom it may concern:

Be it known that I, MALVERN W. ILES, of Denver, county of Arapahoe, State of Colorado, have invented a certain new and useful Improved Forehearth-Jacket for Blast-Furnaces, of which the following is a true and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to blast furnaces provided with what are known as fore-hearths, and has for its object to provide a jacket or casing for the upper part of the projecting hearth at once simple, durable and adapted to the use for which it is intended.

The patent to Eurich, No. 424,104, of March 25, 1890, shows and describes a furnace in its general features similar to those with which my invention is adapted for use, and my invention may be considered as an improvement upon the devices shown in the Eurich patent.

The principal features of my invention will be best understood as described in connection with the drawings in which they are illustrated, and in which—

Figure 1 is a front elevation of the improved furnace; Fig. 2 a side elevation on the irregular section line 1—2 of Fig. 1; Fig. 3 a horizontal section plan on the line 3—4 of Fig. 2; Fig. 4 a plan view of the forehearth and its attached parts on the line 5—6 of Fig. 5; Fig. 5 a front elevation of the forehearth; Fig. 6 a side elevation of the forehearth jacket and parts to which it is connected; Fig. 7 a front view of the adjustable slag sprout; Fig. 8 a side view of the adjustable slag spout, showing how it is attached to the fore-hearth, said view being taken on the section line 9—10 of Fig. 5, and Fig. 9 a section on the line 11—12 of Fig. 6.

A indicates the main stack of the furnace supported in the usual way, B B the side water jackets, C C the front water jackets, D the crucible extending beyond the front of the furnace to form a fore-hearth D'.

E is the dam-jacket which separates the upper portion of the fore-hearth from the furnace. The said upper portion of the forehearth is formed by means of a U-shaped casting F F' F' which rests upon the projecting front of the crucible proper, and is firmly

secured to the dam-jacket E or side jackets B. Preferably this wall section F F' F' is formed as a water jacket, although, under certain conditions, it is advisable that the cast iron shell having the form described should be lined with some refractory material. At the top edge of the section or jacket is formed an opening F⁴ through which slag is allowed to continuously run; the opening should be made somewhat deeper than the level at which it is desired to draw off the slag, and this level regulated by means of an adjustable slag spout consisting of a plate H having formed with it a spout H² provided with slots H' H' by which it is secured to the face of the section or jacket F by means of bolts I which are secured in a tubular portion f in the jacket casing. It is obvious, of course, that by loosening these bolts the spout can be moved up or down and adjusted to the proper level. An opening F³ is formed in the lower portion of the section or jacket for the exit of matte; preferably, it is made elongated in shape as shown, and where the section F F' F' is used as a water jacket it is important that this opening F³ should extend from the bottom in the form of a notch as shown in the drawings. By this construction, while the opening is cooled at the sides by the water, it is not cooled at the bottom, and the matte runs out in direct contact with the top of the crucible, which, being made of a refractory material, is maintained at a high heat. By this construction the aptness to cool in the opening is greatly diminished. A matte spout J is conveniently secured to the front of the crucible as indicated in the drawings.

In order to fasten the fore-hearth to the furnace I form upon its edges reversely lugs F⁵ F⁵, and form similar lugs B⁵ upon the nearest water jackets B.; wedge shaped and perforated plugs G are then slipped into the tapered openings between the lugs as shown in Fig. 9, and bolts G' are passed through the openings in the wedges to hold the fore-hearth in place as shown.

F² is a handhole to permit the cleaning of the forehearth section.

K is a matte pot, and L a slag pot adapted to receive the material from spouts J and H². It is preferable to have both the slag and matte openings in the front of the section F

F' F' and in order that slag and matte may be drawn at the same time I use the oblique spout H² which will deliver the slag into the pot situated at one corner of the fore-hearth as shown.

5 Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

10 1. A U-shaped fore-hearth wall section having openings formed through it at different levels for matte and slag and means for securing it to a cupola furnace above the projecting crucible thereof.

15 2. A U-shaped forehearth wall section having an opening in its top for the passage of slag and an opening in its bottom for the passage of matte, said wall section adapted to be secured to a cupola furnace above the crucible thereof, in combination with an adjustable plate H, having a slag spout H², and means for securing said plate adjustably in front of the slag opening.

25 3. A U-shaped fore-hearth wall section having openings formed through it at different levels for the passage of matte and slag, and having at its ends two or more sets of reversely inclined lugs F⁵ substantially as and for the purpose specified.

30 4. A U-shaped fore-hearth water jacket F' F' having a passage F⁴ at its top for slag, a notched passage F³ formed in its bottom edge for matte, and suitable openings whereby a circulation of water may be maintained through said jacket.

35 5. A U-shaped fore-hearth water jacket F

F' F', having cleaning openings F² at its corners, a passage F⁴ at its top for slag, a notched passage F³ formed in its bottom edge for matte and suitable openings whereby a circulation of water may be maintained through said jacket. 40

6. A U-shaped fore-hearth water jacket F' F', having reversely inclined lugs F⁵ at its ends, a passage F⁴ at its top for slag a notched passage F³ formed in its bottom edge for 45 matte and suitable openings whereby a circulation of water may be maintained through said jacket.

7. A U-shaped fore-hearth water jacket F' F' having a passage F⁴ at its top for slag, 50 a notched passage F³ formed in its bottom edge for matte and suitable openings whereby a circulation of water may be maintained through said jacket in combination with an adjustable plate H having a spout H², secured 55 to the jacket and registering with the slag opening.

8. A U-shaped fore-hearth water jacket F' F' having a passage F⁴ at its top for slag, a notched passage F³ formed in its bottom 60 edge for matte and suitable openings whereby a circulation of water may be maintained through said jacket, in combination with an adjustable plate H having an obliquely set spout H², secured to the jacket and register- 65 ing with the slag opening.

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Witnesses:

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