

UNITED STATES PATENT OFFICE.

FREDERICK M. BECKET, OF NIAGARA FALLS, NEW YORK, ASSIGNOR TO ELECTRO METALLURGICAL COMPANY, OF NIAGARA FALLS, NEW YORK, A CORPORATION OF WEST VIRGINIA.

ELECTRIC-FURNACE LINING.

1,049,801.

Specification of Letters Patent.

Patented Jan. 7, 1913.

No Drawing.

Application filed October 12, 1911. Serial No. 654,415.

To all whom it may concern:

Be it known that I, FREDERICK M. BECKET, a subject of the King of Great Britain, residing at Niagara Falls, in the county of Niagara and State of New York, have invented certain new and useful Improvements in Electric-Furnace Lining, of which the following is a specification.

This invention relates to a lining for electric furnaces, especially those which are used in the production of ferrotungsten, ferrochromium and similar alloys.

Ores of tungsten, chromium and other difficultly-reducible metals may be smelted in furnaces lined with carbon, but the reduced metal or alloy then becomes undesirably carburized by contact with such lining. Usual linings other than carbon are expensive and short-lived, notwithstanding the high temperatures and corrosive slags.

According to the present invention, these furnaces are lined with tungsten or a tungsten alloy, preferably a ferro-alloy high in tungsten, for example one containing 80 per cent. and upward. The lining may consist of cast plates of the alloy, or of refractory blocks faced with an adherent layer of the alloy. The plates or blocks are preferably surrounded by the usual water-cooled casing.

A composite block coated with ferrotungsten may be made by molding a mixture of a tungsten ore containing iron and carbon, and heating the surface of the block to the reduction-point of the metals, either by a flame or electrically, whereby the surficial portion is converted into an adherent facing of ferrotungsten. An electric arc or arcs may be applied to the facing, to render it

dense, smooth and homogeneous. The facing of ferrotungsten may be reduced from or applied to the blocks either before or after they have been built into the electric furnace.

A furnace lining consisting essentially of tungsten, for example a high-tungsten ferro-alloy, has a high melting point and is chemically inert toward the slags produced in smelting ores of tungsten and chromium. It does not contaminate the product with carbon and is much more durable than a lining of magnesia or silica. In operating furnaces having such linings, it is desirable to maintain a reducing atmosphere in the furnace, to prevent oxidation of the exposed surfaces of the lining above the bath or charge undergoing reduction.

I claim:

1. An electric furnace having a lining consisting of ferrotungsten.
2. A furnace lining, comprising a body having a facing consisting essentially of tungsten.
3. A furnace lining, comprising a refractory body having an adherent facing of ferrotungsten.
4. A furnace lining, comprising a refractory body having an adherent facing essentially of tungsten reduced from said body.
5. A furnace lining, comprising a refractory body having an adherent facing of ferrotungsten reduced from said body.

In testimony whereof, I affix my signature in presence of two witnesses.

FREDERICK M. BECKET.

Witnesses:

EUGENE A. BYRNES,
CHARLES H. POTTER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

It is hereby certified that in Letters Patent No. 1,049,801, granted January 7, 1913, upon the application of Frederick M. Becket, of Niagara Falls, New York, for an improvement in "Electric-Furnace Lining," an error appears in the printed specification requiring correction as follows: Page 1, line 19, for the word "notwithstanding" read *not withstanding*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 27th day of April, A. D., 1915.

[SEAL.]

J. T. NEWTON,

Acting Commissioner of Patents.

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J. T. NEWTON,

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