

UNITED STATES PATENT OFFICE.

GEORGE H. SELLERS, OF WILMINGTON, DELAWARE.

IMPROVEMENT IN LINING ROTARY PUDDLING-FURNACES.

Specification forming part of Letters Patent No. 129,685, dated July 23, 1872.

To all whom it may concern:

Be it known that I, GEORGE H. SELLERS, of Wilmington, county of New Castle, Delaware, have made certain Improvements in Lining Rotary Puddling Vessels and maintaining the same in repair, of which the following is a specification:

The rotary puddling vessel to which these improvements have been applied is that patented to William Sellers March 5, 1872, No. 124,224; and the following description will be clearly understood by referring to the drawing and specification in the aforesaid patent.

The lining (or, as it is technically called, the *fix*) for the sides of the ordinary puddling-furnace is preferably composed of iron ore held in place with the cinder of the furnace, and the use is so universal that it is unnecessary to describe its application. In the ordinary furnace the sides are inclined at a fixed angle so as to support the lining, and the "*fix*" can be readily applied in a plastic state; but in the rotary furnace such "*fix*" would fall from the sides of the vessel as the vessel is rotated; and one of the objects of my improvement is to provide a means for holding the "*fix*" in position while the vessel which contains it is revolving. A further object of my improvement is to provide a convenient method for building the "*fix*" into the puddling vessel; and a still further object of my improvement is to provide a simple and convenient method for repairing the same as it is worn by use. Preparatory to lining the vessel with *fix* the interior should be divided into three or more divisions by strips of metal attached to or cast upon the interior surface of the revolving vessel. These strips may be about one inch in height, or even less, and about three-quarters of an inch wide, their only use being to prevent the lining from sliding in the vessel as it is revolved. In order to enable the ore lining to be applied and retain its position when inverted, which must be the case when the vessel is revolved, I divide the *fix* into two parts, one of which is the base upon which the lining or working *fix* is to be attached. The first or preliminary *fix* is made by pulverizing ore and mixing it just before using with cement of suitable quality, such as Portland cement and silicate of soda, in the following proportions: To every

ten parts (by measurement) of ore I add one and a third part of cement, and to each bushel of this mixture I add one and a half gallon of silicate of soda; the whole to be thoroughly mixed through a loam or pug mill to insure a thorough incorporation of the silicate of soda with the mass of ore and cement. The material being thus prepared, I turn one of the divisions of the puddling vessel, before described, so that it shall be at the bottom of the vessel, so that the *fix*, when poured into said division, will be supported by the strips of metal, hereinbefore described. I place temporary strips of wood of a depth equal to that of the preliminary *fix*, the purpose of these strips being to support the edges of the preliminary *fix* when rammed into this division, as hereinafter described. Into this division I ram or pack the prepared material to a uniform thickness of about two inches. I then turn this division up, and treat the second and third or more divisions in a similar manner. I then remove the wooden strips and ram the prepared material into the spaces left by removing the strips, and in a few hours the whole mass will set so as to be quite solid. I now apply heat until this preliminary *fix* is a bright red, and upon this I apply fluid-tap cinder, rotating the vessel until the whole surface of the *fix* is coated with cinder. If no convenient means for melting the cinder separately from the rotary puddler is at hand, it may be melted upon the *fix* itself. After the *fix* has been covered with the fluid-cinder the heat should be slackened to allow the cinder to set. Upon this *fix*, as a base, I then apply the working-*fix*, which is composed of lump-ore, scale, bull-dog, and cinder-tap, or lump-ore and cinder-tap alone.

This working-*fix* I attach to the base in the following manner: Upon about one-third of the lower interior surface I apply the working-*fix* above described to a depth of from four to six inches, as may be desired. I then raise the heat of the furnace sufficiently to melt the cinder, and pack or ram the ore together, and then cool the furnace down until the cinder sets, which may be facilitated by dashing water upon it in suitable quantity. I then treat another one-third of the interior of the vessel in the same manner, and so on until the whole is completed, when the vessel is ready for use.

This lining will, by use, wear; but usually this will occur in spots. These may be repaired by turning the place down, filling up the worn space with working-fix, as before, and adding sufficient cinder to fill up the interstices between the ore, raising the heat to melt the cinder, ramming or packing the ore in place, as before, and cooling off with water to set the cinder, when the fix will be in condition to resume work.

Having thus described the composition and mode of using my improvement, I claim as new and desire to secure by Letters Patent—

1. As an improvement in the art of lining rotary puddling-vessels, the method hereinbefore set forth of retaining the fix in position by partitions transverse to the line of rotation of the puddling vessel.

2. The improvement in the art of lining rotary puddling vessels, substantially as herein-

before set forth, by smelting a working-fix upon a preliminary fix composed of the ingredients, herein specified, previously attached to the puddling vessel in the manner described.

3. The improvement in the art of lining rotary puddling vessels, as hereinbefore set forth, by recharging and resmelting fresh material in the worn places of the working-fix.

4. The improvement in the art of lining rotary puddling vessels by means of a preliminary fix composed of pulverized iron ore, Portland cement, and silicate of soda, substantially as hereinbefore set forth.

In testimony whereof I have hereunto subscribed my name.

GEORGE H. SELLERS.

Witnesses:

ELI GARRETT,

ALBERT W. SMITH.