

UNITED STATES PATENT OFFICE.

JOHN WILLIAMS, OF MONTREAL, CANADA.

IMPROVED COMPOSITION FOR LINING PUDDLING-FURNACES.

Specification forming part of Letters Patent No. 43,168, dated June 14, 1864.

To all whom it may concern:

Be it known that I, JOHN WILLIAMS, of Montreal, in the Province of Canada, have invented a new and Improved Cinder-Cement for Lining Furnaces; and I do hereby declare that the following is a full, clear, and exact description thereof, which will enable others skilled in the art to make and use the same.

This invention consists in a composition mixed together of cinders taken from puddling-furnaces, or the cinders taken from heating-furnaces when a good quality of sand has been used, or cinders from a squeezer or hammer machine, or iron scales from rollers, &c., which cinders have to be pulverized or reduced to the size of fine shot, and to these cinders are added lime of good quality, salt, and pulverized sandstone, or a first-rate quality of fire-sand entirely free of clay or other earthy material. The proportions in which these ingredients are mixed together is about as follows: cinders, two thousand pounds; lime, four hundred pounds; salt, two hundred pounds; pulverized sandstone or fire-sand, two hundred pounds. These ingredients are thoroughly incorporated together either by hand manipulation or by passing the mixture through a stamping-mill in a similar manner to that employed for making common mortar, adding during the process a sufficient quantity of water to bring the mass to the consistency of stiff clay or mortar, and then allowed to stand about twelve hours, in order to have it properly seasoned before being employed to line the furnace. At the expiration of this time the material may be made into balls or lumps, and in that shape placed around the metal sides of the furnace for the iron to work against.

The ordinary way for lining furnaces is by means of pieces of iron ore, which are placed around the sides as compactly as possible, at a cost of about seven dollars per ton, and will require eight hundred-weight of ore for each ton of iron manufactured. One lining will last on an average one day, and it requires constant attention on the part of the puddlers to prevent the ore mixing with the iron and injuriously affecting its quality.

My cinder-cement, on the other hand, will

cost from two to two and a quarter dollars per ton, six hundred-weight of which will manufacture one ton of iron, and it requires less care on the part of the puddlers than the usual lining, as the cement will not mix with the iron to injure it, as the ore will.

A great advantage possessed by this cinder-cement is that it can be made or put around the furnace in such a manner as to be impervious to the melted metal, and thus preserve the exterior iron casing from contact with the liquid metal.

I am aware that Letters Patent were granted to F. M. Ruschaupt on the 19th of April, 1864, for a furnace-lining consisting of cinder or waste solidified with clay and lime. This I do not claim, having found the use of sand essential to the object I have in view, whereas clay is highly deleterious. In working all pig-iron in a puddling-furnace the object is to get the iron as close as possible, in order to make the iron squeeze and roll well and have it of a good quality when in bars, which causes so much less waste when it has to be worked over in a reheating-furnace. The great difficulty in using cinder-cement without sand is to get the iron clear in the furnace. The use of clay is a decided injury to the iron, for it is almost impossible to get the iron clear when clay is used in cinder as a mixture, for we always try to keep clay out of the body of the furnace—at any rate, from among the iron; whereas the sand has the reverse effect, acting as a flux, and by its cutting action in contact with the iron tends to clear the same much sooner than the clay, producing a much better quality of iron and effecting a considerable saving in fuel.

In my invention the presence of salt has the effect of purifying the cinder and makes the cement stronger and more durable.

What I claim as new, and desire to secure by Letters Patent, is—

The within-described composition of cinder-cement mixed together of the ingredients above specified, substantially in the manner and about in the proportion set forth.

JOHN WILLIAMS.

Witnesses:

CHARLES LEGGE,
GEO. MITCHELL.