UNITED STATES PATENT OFFICE.

JOSEPH WOODWARD, OF LEAMINGTON, COUNTY OF WARWICK, ENGLAND.

IMPROVEMENT IN TREATING FURNACE-SLAG TO CONVERT THE SAME INTO TILES, SLABS, AND BLOCKS.

Specification forming part of Letters Patent No. **221,649**, dated November 11, 1879; application filed October 13, 1879.

To all whom it may concern:

Be it known that I, JOSEPH WOODWARD, of Leamington, county of Warwick, England, have invented a new and useful Improvement in Treating Furnace-Slag to Convert the Same into Tiles, Slabs, and Blocks, of which the following is a specification.

My invention relates to the utilizing of furnace slag or scoria by converting it into tiles, slabs, or blocks for paving and other purposes.

Attempts have been made to manufacture tiles, blocks, and slabs of slag by casting it in suitable molds; but these attempts have failed owing to the difficulty heretofore experienced in so tempering the slag as to deprive it of its brittle properties.

I overcome these difficulties in the manner which I will now proceed to describe.

As soon as the slag which has been cast into the mold is sufficiently set, but still at a blood-red heat, I remove the tiles, blocks, or slabs to a furnace or kiln, where they are subjected to a white heat, or to a heat as intense as possible without causing a refluxing of the slag.

The furnace or kiln is heated before the charging operation, after which the air must be excluded by a proper luting of all apertures, the supply of fuel to the kiln being then discontinued.

The tiles, blocks, or slabs are permitted to remain in the closed furnace or kiln for a length of time (ordinarily from four to six hours) which may depend upon the size of the tiles or slabs and upon the character of the slag used. On removing the tiles or slabs they are permitted to become cool, and are then ready for use.

The slag by this process of tempering loses its brittle properties, and becomes so hard and compact that the tiles, slabs, or blocks can be used to advantage in the making of durable pavements, and for many other purposes.

Care should in all cases be taken to prevent the blocks or slabs from becoming reduced to a lower temperature than a blood-red color indicates before they are subjected to the greater heat by which the desired temper is imparted to them.

The inflammable waste gases of blast-furnaces may be utilized in heating the furnaces or kilns.

When slag has been tempered in the manner described it has none of the dark appearance of ordinary slag, but has the aspect and characteristics of a grayish, compact, hard, and fine grained stone.

When the molds are heated prior to receiving the molten slag, the tile, slab, or block will have the above characteristics throughout; but the use of chilled molds will result in the production of tiles or slabs with vitreous coatings, and these may be used to advantage in the building of sewers and for other purposes.

It should be understood, however, that when cold molds are used the slag therein should not be permitted to become cool before the tiles or slabs are placed in the furnace or kiln.

I claim as my invention—

1. The mode described of treating the slag or scoria of furnaces, the same consisting in first casting the molten slag in suitable molds for tiles, slabs, blocks, and other objects, and then removing the latter from the molds, and, while they are still hot, subjecting them to a greater heat in a closed furnace, all substantially as set forth.

2. As a new manufacture, a slag tile, slab, or block having a grayish appearance, and possessing the characteristics of a very hard, dense, and fine-grained stone, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSEPH WOODWARD.

Witnesses:

CHAS. F. TIETZE,

HARRY SMITH.