

# UNITED STATES PATENT OFFICE.

WILLIAM P. BARBA, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE MIDVALE STEEL COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

PROCESS OF PROTECTING METAL ARTICLES HEATED BY THE COMBUSTION OF POWDERED COAL.

1,167,472.

Specification of Letters Patent.

Patented Jan. 11, 1916.

No Drawing.

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*To all whom it may concern:*

Be it known that I, WILLIAM P. BARBA, a citizen of the United States, residing at Philadelphia, county of Philadelphia, and State of Pennsylvania, have invented a new and useful Improvement in Processes of Protecting Metal Articles Heated by the Combustion of Powdered Coal, of which the following is a full, clear, and exact description.

My invention relates to the process of burning powdered coal in a furnace containing billets or other articles of metal to be heat-treated or to be heated preparatory to forging. The known advantage of this process is that it supplies heat at a relatively low price. The process involves the deposition of the ash upon the articles undergoing treatment, which has certain advantages in that it affords a coating that acts to reduce oxidation. The process, however, has certain deleterious effects upon the articles undergoing treatment. While the coating of the articles with ash tends to reduce oxidation, the ash usually fails to fuse with the scale to such an extent as to form a perfectly satisfactory protective coating, which scale is not only therefore so great in depth as to involve a considerable loss of metal but often adheres so closely to the articles as to render somewhat difficult its necessary removal preparatory to forging.

My invention consists in adding to the coal an inorganic basic substance, preferably calcium carbonate, in quantity sufficient to raise the fusing point of the ash to an extent which will cause the modified ash to adhere to the billets and build up a protective coating therefor for the purpose of minimizing oxidation, while avoiding the addition of such larger quantity as would elevate the

fusing point to an extent which would destroy the adherent properties of the modified ash. I have found that the maximum percentage of calcium carbonate that will serve to produce the desired effect is about 65 per cent. of the ash-forming constituents of the coal and the best results are produced if the quantity added is not over 50 per cent. If calcium oxid is used I prefer to add about 25 per cent. of the weight of the ash-forming constituents of the coal. The result is that not only is the scale thus formed comparatively thin, but its toughness and brittleness is so modified that it possesses weak adherent properties and can be readily removed before forging.

Having now fully described my invention, what I claim and desire to protect by Letters Patent is:

The process of protecting metal articles in a furnace in which the coal is burned in a powdered form, which consists in burning in a furnace containing such metal articles powdered coal mixed with an inorganic basic substance in a proportion to the weight of the ash forming constituents of the coal, sufficient to raise the melting point of the ash to the extent required to cause it to adhere to the billets and form a protective coating therefor to minimize scale and insufficient to elevate such melting point to a degree which would destroy its adherent property, substantially as described.

In testimony of which invention, I have hereunto set my hand, at Philadelphia, on this 27th day of July, 1914.

WILLIAM P. BARBA.

Witnesses:

JOSEPH ENTWISLE,  
ARTHUR KRONEMANN.