UNITED STATES PATENT OFFICE.

E. R. WESTON, OF EAST CORINTH, MAINE.

IMPROVEMENT IN THE PROCESS OF CONVERTING IRON INTO STEEL BY CEMENTATION.

Specification forming part of Letters Patent No. **32,546**, dated June 11, 1861.

To all whom it may concern:

Be it known that I, E. R. WESTON, of East Corinth, in the county of Penobscot and State of Maine, have invented a new and useful Improvement in the Process of Steeling Wrought and Malleable Iron; and I do hereby declare that the following is a full, clear, and exact description of the same.

To enable those skilled in the art to fully understand my invention, I will proceed to describe the manner in which I have carried it out in practice.

Into a No. 100 black-lead crucible are placed from fifty to seventy-five pounds of iron articles to be steeled, together with four ounces (more or less) of cyanide of potassium or any other cyanogen compound and sufficient powdered charcoal to cover the articles or nearly fill the crucible. The contents of the crucible are now covered by a stratum of fire-clay, and over this is placed a small quantity of lead or other fusible metal which fuses at a dark-red heat. Thus prepared the crucible is placed in the furnace and maintained at a bright-red heat, time dependent on the depth to be steeled—one-sixteenth of an inch, for instance, usually requires about one hour. By thus heating the cyanide of potassium, charcoal, and iron together the cyanide is decomposed into cyanogen gas and potassium. By coming in contact with the iron the cyanogen gas is again decomposed, carbon being absorbed by the iron and nitrogen escaping, which, uniting with the charcoal in the presence of potassium, forms another portion of cyanogen, and so on.

Instead of cyanide of potassium, cyanide of ammonium or any other compound of cyanogen with an alkali metal might be used.

The lead which covers the contents of the crucible will fuse by the heat, being prevented from mixing with the iron and chemicals in the lower part of the crucible by the stratum of fire-clay, and in this fused state hinders to a certain extent the escape of the gas from the crucible. The gas is thereby compelled to diffuse itself equally throughout the crucible, and at the same time it is kept under an increased pressure or in a more condensed state than when allowed to escape from the crucible, and it therefore acts uniformly and with increased intensity on the iron. The fused lead also prevents the ingress of atmospheric air to the contents of the crucible. If the air were admitted, the success of the operation would be defeated, as the iron would be oxidized and become blistered.

When the fused metal is not used the cyanogen gas escapes readily, and it is not equally diffused throughout the crucible, so that some of the iron articles are influenced more than the others, and at the same time the gas acts only on the surface of the iron. By the application of the fused metal, on the other hand, the gas is uniformly diffused throughout the crucible and all the articles are equally affected, and by keeping the gas in a condensed state it can be made to act on the iron to its very core.

I do not claim the employment of cyanogen or ammoniacal compounds, nor do I claim broadly the use of fire-clay as a seal for crucibles.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The use of the fused or fusible metal upon the clay covering in the crucible, as set forth.

E. R. WESTON.

Witnesses:
JACOB LOVEJOY,
JOHN C. EDMUNDS.