

UNITED STATES PATENT OFFICE.

SAMUEL McDONALD, OF BRADDOCK, PENNSYLVANIA.

PROCESS OF MANUFACTURING BESSEMER STEEL.

SPECIFICATION forming part of Letters Patent No. 287,842, dated November 6, 1883.

Application filed July 23, 1883. (No specimens.)

To all whom it may concern:

Be it known that I, SAMUEL McDONALD, a citizen of the United States, residing at Braddock, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Process of Manufacturing Bessemer Steel, of which the following is a specification.

My invention has relation to improvements in the Bessemer process of making steel; and the object of my improved process is to reduce the cost of manufacture, as well as lessen the time of production, and produce a superior article of steel by the use of the ordinary forms of converters; and to these ends the process consists in dividing the air-blast, so as to force a portion of it through the charge and a portion into the converter without passing through said charge, as will be hereinafter more fully described.

In carrying out my improved process the ordinary form of converter may be used, and the charge introduced in the usual manner while the converter is in the horizontal position. The blast is then turned on, and the converter gradually tilted to about, say, thirty or forty-degrees from its former position. This allows the charge to partially cover the tuyere in the bottom of the converter, and a portion of the blast to escape through the body of the charge, and the remaining portion enters the converter above the charge. That portion of the blast which passes through the charge furnishes its oxygen to the carbon of the metal, forming carbonic-oxide gas, which escapes to the surface. There it combines with the oxygen of the blast admitted above said charge, and produces an intense heat, which raises the temperature of the charge to a degree required to produce a pure article of steel.

It will readily be seen that the utmost importance is attached to the degree of inclination of the converter, so that the proper proportions of air may be admitted above and through the charge to accomplish the best result; and as these proportions vary with the composition of the different charges, skill and experience are required in determining said inclination to attain these ends.

I have very successfully carried out my process by raising the converter to a vertical position after it has been charged and the blast

applied, and then gradually lowering it until the proper proportion of air was admitted above the blast to produce a perfect combustion in the converter, whereby the degree of heat may be regulated, as above set forth.

While I have described a way to carry out my process, I do not wish to limit myself to any particular manner of carrying out said invention, as it will be apparent that any system by which the blast may be admitted simultaneously through and above the charge will accomplish said result.

I have found it necessary at times to vary the proportions of the divided blast in the same charge, for if, upon observation, the charge should be heating too much, the converter must be brought nearer a vertical position. This cuts off a portion of the direct blast and lessens the supply of oxygen. Consequently the temperature lowers, as required. If, on the other hand, the charge should be cooling, the converter is tilted nearer a horizontal position. This increases the direct blast, and a greater amount of oxygen is supplied, and a greater degree of heat obtained in the converter.

I am aware that substances rich in oxygen have been blown into molten metal, and an air-blast supplied above the same; but I use air alone and regulate its admission in proper proportions by varying the degree of inclination of the converter.

Having thus fully described my improved process, what I claim as new and useful, and desire to secure by Letters Patent of the United States, is—

1. The improvement in the process of manufacturing Bessemer steel, which consists in simultaneously admitting the air-blast through and above the charge, as set forth.

2. The improvement in the process of manufacturing Bessemer steel, which consists in simultaneously admitting the air-blast through and above the charge and varying the relative proportions of said blast, as and for the purposes set forth.

In testimony whereof I affix my signature in presence of two witnesses.

SAMUEL McDONALD.

Witnesses:

JOS. WALTERMEYER,
H. J. ENNIS.