

UNITED STATES PATENT OFFICE.

JOHN MILLWOOD, OF MINERVA, OHIO, ASSIGNOR TO JAMES E. ATWOOD,
OF PITTSBURG, PENNSYLVANIA.

IMPROVEMENT IN THE MANUFACTURE OF STEEL FOR CASTING IN GREEN SAND-MOLDS.

Specification forming part of Letters Patent No. 123,503, dated February 6, 1872 ; antedated January 22, 1872.

To all whom it may concern:

Be it known that I, JOHN MILLWOOD, of Minerva, Stark county, State of Ohio, have invented or discovered a certain new and useful Improved Process of Manufacturing Steel; and I do hereby declare that the following is a full, clear, and exact description of the same, sufficient to enable others skilled in the art to make and use the same.

Heretofore many attempts have been made to cast ordinary steel in green or moist sand-molds, but so far such have proved unsuccessful, owing to the fact that when molten steel, as usually produced, comes in contact with the moisture or particles of water contained in the said molds, an expansion of gases takes place, and almost instantaneously the molds are blown apart, and the molten metal scattered in all directions; in many instances destroying both life and property. In order to overcome these serious objections, and to produce an article of steel adapted to be cast in such molds is the essential feature of my invention; and to this end the same consists in the employment of any pig or cast iron which contains carbon, which is melted in a crucible, and agitated in a suitable manner until the same is deprived of about one-half of its carbon, whereby a light steel is produced, which, when poured into a green or moist sand-mold, for the purpose of casting any article or device, will not blow, and after being in the mold a short space of time becomes cool, and when removed from the green sand-mold will be in a great measure free from scales on its exposed surface.

In carrying out my invention I use or employ pig or cast iron, in which about four (4) per cent., more or less, of carbon is present. The same is placed in a common crucible, and as the iron is approaching or has reached a molten or liquid state, due to the heat applied,

I, by means of a wrought-iron rod or other suitable device agitate or stir up the molten mass, by which means the cast-iron is deprived or relieved of about half or two (2) per cent. of its carbon, thus rendering the same what is termed a high steel. Having proceeded so far with the treatment of the fused metal, I apply a lid to or cover the crucible, and allow the furnace to run, say, about one-half of an hour, or at least until a white heat is obtained, when the molten metal is ready for pouring into the various green sand-molds. This molten metal while in the crucible, and being poured from the same, is free from bubbling, and resembles in appearance quicksilver.

The molds which I use in casting agricultural implements, say, such as plowshares, cultivator-teeth, axes, hammers, anvils, sledges, &c., I construct from green sand, and which are ready at once to receive the molten metal, all delay of baking the molds and using a chill being dispensed with; thus I not only save labor but much expense.

It is found that the steel or articles thus cast are susceptible of hammering when cold, but will crumble or fly to pieces if hammered when hot.

Having thus described my invention or discovery, what I claim, and desire to secure by Letters Patent, is—

Steel produced from iron containing carbon, by melting it in a crucible until deprived of a portion of its carbon, substantially as described, for the purpose of casting in green sand-molds.

To the above I have signed my name this 13th day of May, 1871.

JOHN ^{his} × MILLWOOD.
mark.

Witnesses:

JOHN CRIDER,
J. ST. CLAIR.