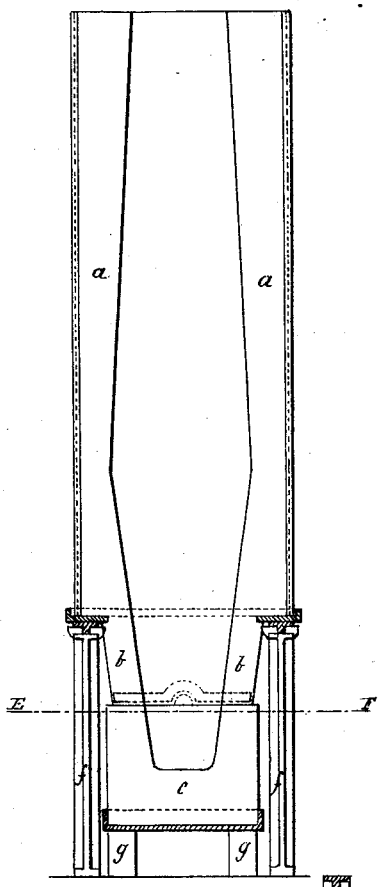
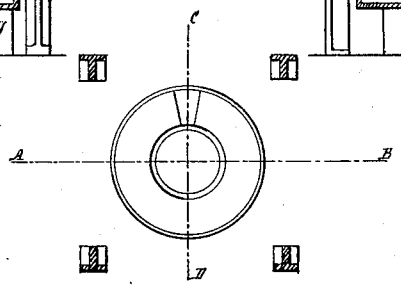
A. JULLIEN.

Manufacture of Ferro-Manganese.

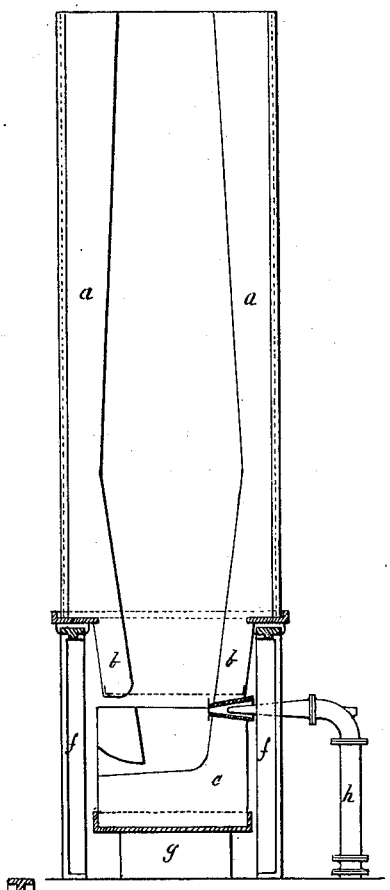
No. 163,782. Patented May 25, 1875



.FIG.2.



.FIG.3.



.FIG.1.

WITNESSES.

INVENTOR.

UNITED STATES PATENT OFFICE.

ALEXANDRE JULLIEN, OF PARIS, FRANCE.

IMPROVEMENT IN THE MANUFACTURE OF FERRO-MANGANESE.

Specification forming part of Letters Patent No. **163,782**, dated May 25, 1875; application filed July 18, 1874.

To all whom it may concern:

Be it known that I, ALEXANDRE JULLIEN, of Paris, France, Manager of the Foundries and Forges Company of Terre Noire, La Voulte, and Besseges, in the French Republic, have invented a new or Improved Process for the Manufacture of Metallic Alloys, of which the following is as pecification:

This invention relates to certain improvements in the manufacture of alloys of iron and manganese to be employed in the manufacture of steel, the object being to agglomerate the iron in the form of filings, shavings, spongy iron, or the like, with the native oxides of manganese, and form the same into bricks which will retain their form until they reach a temperature sufficient to melt them and form definite combinations of iron and manganese after reduction.

In order to properly reduce said compounds it is necessary to have them intimately mixed while subjected to the action of heat in the furnace, in order that proper decomposition and union may take place. Great difficulty has been experienced in introducing them in a fine state of mechanical division, as is well known to manufacturers, as the iron has to be employed in the form of filings, or in other finely-comminuted state, and the oxides or ores of manganese brought to the state of powder before they can be intimately commingled. The result is that, when employed in this manner, they choke up the fire, or, when sufficient draft is applied to keep it up, the lighter portions, consisting of the pulverized ore, are carried off, and no definite alloys can be successfully reduced from the materials. Various attempts have been made to overcome these objections by forming bricks or blocks by cementing the iron and the ores, in a state of fine division, together by means of pitch, tar, fatty earths, and the like, but such have proved futile, owing to the fact that a moderate heat would readily melt the cementing material and allow the mass to run together long before reduction commenced.

My invention is particularly designed to obviate these defects by taking advantage of the natural reactions of the iron and the various ores of manganese, all of which contain variable proportions of silica, which will form an efficient cementing material for the mass when subjected to the action of alkaline solutions.

My invention consists in a process of agglomerating iron, in a fine state of division, with manganic oxides by treating the same with ammoniacal solutions and pressing them into bricks or blocks in such proportions as to form definite alloys when properly reduced, as will be hereinafter set forth.

In carrying out my invention, the iron, in the shape of filings, turnings, or pulverized or spongy iron, is mixed with any ore or natural oxide, such as manganite, braunite, hausmannite, &c., pulverized or finely comminuted, and the mass moistened with an ammoniacal solution and subjected to powerful pressure in molds, the ammonia decomposing the mass and forming a cementing material which will hold the compounds in form until they reach a reducing temperature, and prevent them from running together and interfering with the process.

In practice, the following proportions will be found to answer in preparing my improved blocks: Iron in the shape of filings, sponge, &c., one hundred parts. Manganite in state of powder, from thirty-three to fifty parts.

These are well commingled and mixed to the consistency of dough or a stiff mortar with ammoniacal liquor, or saturated solutions of ammoniacal salts in water, such, for instance, as sal-ammoniac, and the mass powerfully compressed in the molds and allowed to remain until solidified, in which condition they may be readily reduced in a blast or cupola furnace, forming definite alloys of iron and manganese with a trace of silicon.

In order to melt the compound an extremely-high temperature has to be employed, which renders it necessary to use a furnace with a removable hearth or crucible which can be removed and renewed at pleasure when burnt out.

The drawing represents the furnace which I prefer to use in the manufacture of the improved alloy.

Figure 1 represents a vertical section of the furnace through line C D of Fig. 3; Fig. 2, a section through line A B of Fig. 3; and Fig. 3, a plan view of the furnace.

The main body or cupola of the furnace is

represented by the letters *a a*, and the boshes by the letters *b' b*. The removable crucible is shown at *c* supported upon standards *g g*. The cupola is made of hard fire-brick and the boshes of lime, alumina, magnesia, or other refractory material. The crucible is made in one piece of carbon or graphite by mixing the same, properly pulverized with coal, and molding the mass into the proper shape and subjecting it to the action of heat until the gaseous portions are drawn off.

The furnace illustrated and described I disclaim, as it forms the subject of a separate application.

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

The process herein described of producing definite alloys of iron and manganese by combining the iron, in a state of fine division, with the comminuted ores of manganese, moistening the mass with ammoniacal solutions, and forming into bricks and reducing the same by heat, substantially as described.

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Witnesses:
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