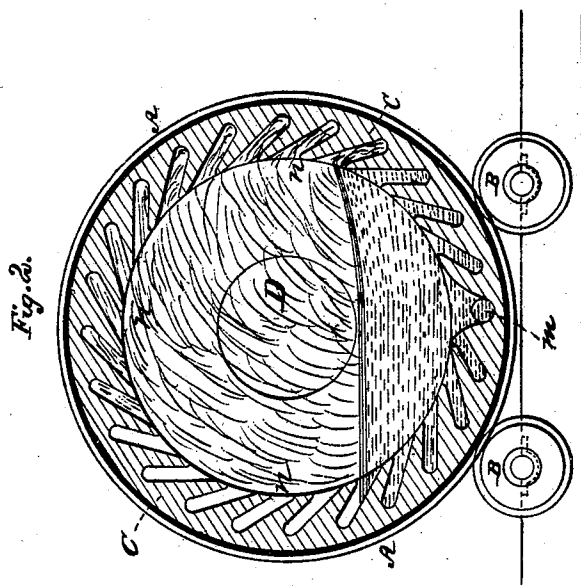
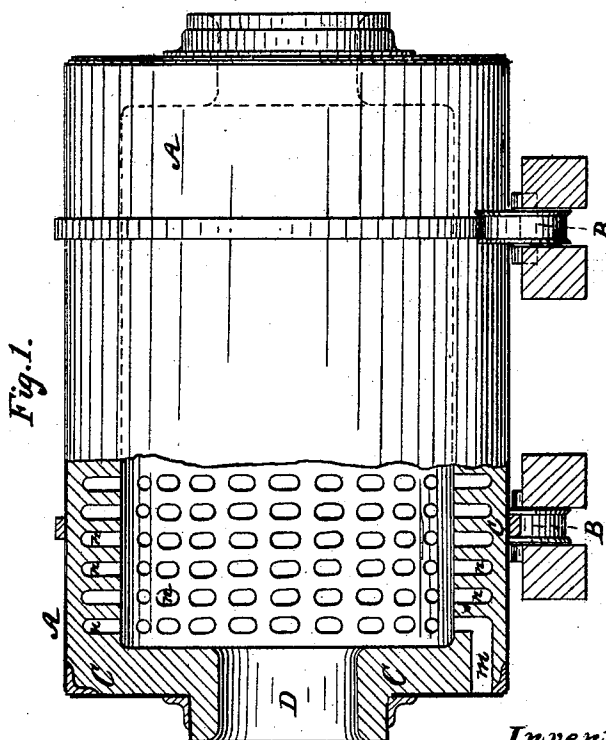


J. F. ALLEN.  
Decarbonizing Iron.

No. 76,581.

Patented April 14, 1868.



Witnesses:

Henry & Rhodes.  
Wm Dufell.

Inventor:

John F. Allen.

# United States Patent Office.

JOHN F. ALLEN, OF TREMONT, NEW YORK.

*Letters Patent No. 76,581, dated April 14, 1868.*

## IMPROVEMENT IN DECARBONIZING IRON.

*The Schedule referred to in these Letters Patent and making part of the same.*

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, JOHN F. ALLEN, of Tremont, Westchester county, State of New-York, have invented a new and improved Machine for Decarbonizing Iron; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

Figure I represents a longitudinal view of the apparatus, partly in section.

Figure II is a cross-section of the same.

The nature of my invention consists in an apparatus for decarbonizing cast iron as it comes from the blast-furnace, or of remelted pig-iron, by the use of which the iron is made to fall or pass in a fine spray or shower, for any desired length of time, through a current of air passing through the machine, either by the natural draught or by being forced through the same, so as to subject the molten iron to the oxygen, and to secure an intimate admixture of all particles of the iron with the oxygen in the air or other oxygen-bearing gas or vapor, which may be passed or forced through the machine, for the purpose of allowing said oxygen to combine with the carbon, and to remove thereby, by its combustion, the carbon, silica, and other impurities which are found in the cast iron, in order to convert it into steel or to reduce it in malleable iron.

In order to carry this into effect, I construct a cylinder, A, supported on suitable rollers, B B, or hung on large hollow journals on each end of the cylinder. This cylinder is lined with fire-brick or clay, C, or any other suitable material, provided with small cavities or holes, *n*, all around its inner circumference. One end of this cylinder may be connected with the chimney, so as to create a natural draught, or suitable pipes may be arranged at one end of this cylinder, to force a current of air or other oxygen-bearing gas or vapor into this one end, and allowing the same to pass out at the other end. This cylinder is set in motion by means of belt, gearing, or any other suitable mechanical arrangement.

The melted iron is run in into this cylinder through one of its hollow journals or central opening D, and the machine set in motion, so as to rotate slowly around its axis.

The holes or cavities *n*, situated in the lower part of the cylinder, will be always filled with the molten iron, and as the machine is revolving, the iron in those holes will gradually be thrown out as the holes pass upwards, causing thereby the iron to fall back into the lower part, in the shape of a shower or spray, whereby the several particles of the molten iron are brought in intimate contact with the oxygen contained in the air passing or being forced through the machine, whereby the carbon is rapidly ignited to produce combustion, increasing thereby the temperature of the metal and its fluidity, and at the same time carrying off, in a great measure, the other impurities which are found in the iron.

The length of time the molten metal is subjected to this treatment depends on the capacity of the cylinder, and also on the quality of the metal, as well as on the nature of the product required.

On one end of the cylinder an opening, *m*, is made, through which the decarbonized iron can be run off after the process is completed, which can easily be seen or even tested through the hollow journals or central openings D in the ends of the cylinder.

By this machine a most intimate contact of all particles of iron with the oxygen of the air, and a thorough mixing of all particles, are obtained, and wrought iron ready for the rolls will be produced directly from pig iron, having nearly all the silica and other impurities removed.

By continuing the operation a greater length of time, so as to produce a longer and more perfect admixture of air or other oxygen-bearing gas or vapor with the molten iron, the iron may be further purified to produce semi-steel and steel.

This cylinder A may be made of considerable length, and placed slightly on an incline, when the iron may be run into the cylinder at its elevated end, and come out on the other end decarbonized, making by this a continued process, instead of working by charges depending upon the capacity of the apparatus.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. Purifying iron from its carbon and other impurities, by causing the molten iron, contained in a revolving cylinder, to pass in the shape of a shower or spray through atmospheric air or other oxygen-bearing gas or vapor passing or being forced through the revolving cylinder containing the iron, substantially in the manner as set forth and described.

2. I claim the construction of the revolving cylinder A, with suitable lining C, provided with holes or cavities *n* on the inner circumference, in the manner and for the purpose substantially as set forth and specified.

Witnesses:

HENRY E. ROEDER,  
WM. DERFER.

JOHN F. ALLEN.