

# UNITED STATES PATENT OFFICE.

DAVID BROSE, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF THREE-  
FOURTHS TO GEORGE W. MILLER, JOHN J. McGUIRE, AND GEORGE  
BROMLEY, ALL OF SAME PLACE.

## PROCESS OF MAKING STEEL.

SPECIFICATION forming part of Letters Patent No. 353,247, dated November 23, 1886.

Application filed February 8, 1886. Serial No. 191,219. (No specimens.)

*To all whom it may concern:*

Be it known that I, DAVID BROSE, of Pitts-  
burg, in the county of Allegheny and State of  
Pennsylvania, have invented a new and useful  
5 Improvement in Process of Making Steel; and  
I do hereby declare the following to be a full,  
clear, and exact description thereof.

In the Bessemer process of manufacture of  
steel it is usual, after the charge has been  
10 blown in the converter, to add to the molten  
charge a supply of manganese or spiegeleisen  
to effect the recarburization of the metal. This  
addition is made just before the casting of the  
charge, either before its removal from the  
15 converter or after it has been poured thence  
into the ladles, and great difficulty has been  
experienced in causing the proper mixture of  
the manganese with the metal. The result of  
an imperfect mixture is a steel uneven in its  
20 composition and of lessened utility. The mix-  
ing has been effected, generally, by mechani-  
cal means—such, for example, as by a blast  
of air, or as described in the patent of William  
Hainsworth, No. 284,006, of August 28, 1883;  
25 but such process is unsatisfactory, because it  
is at best incomplete and entails hard labor and  
considerable expense.

I have discovered that the manganese may  
be mixed with the charge by the addition of  
30 limestone thereto either just before or after  
or simultaneously with the manganese addi-  
tion. The result of this treatment is to cause  
a violent ebullition and agitation of the metal,  
which intimately commingles the iron and  
35 manganese together, and upon casting the in-  
gots will be found to be homogeneous in their  
structure. This effect is not produced by the  
presence of lime in the usual basic lining of  
the converter.

In practice I prefer to place the limestone 40  
and manganese in the ladle, and to pour the  
molten metal from the converter upon it, since  
in this way the agitation is more thorough and  
immediate; but I do not desire to limit my-  
self to the time and manner of the treatment, 45  
except that it must be done at about the time  
of introducing the manganese. The use of  
this process cheapens the manufacture of steel  
by reason of the fact that it lessens the quan-  
tity of manganese which need be employed to 50  
carburize a given charge of metal.

I do not desire to claim, broadly, the use of  
limestone with molten metal or lime, or lime-  
stone and manganese; but limestone has not  
been heretofore employed for the agitation of 55  
the bath of metal, as herein described.

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

1. In the art of making steel, the process of  
intimately mixing manganese with the refined 60  
metal, which consists in adding the manganese  
and carbonate of lime to the refined metal at  
or nearly the same time, substantially as and  
for the purpose specified.

2. In the art of making steel, the process of 65  
intimately mixing manganese with the molten  
metal, which consists in placing the manganese  
and carbonate of lime in a ladle and then pour-  
ing the molten metal thereupon, substantially  
as and for the purpose specified. 70

In testimony whereof I have hereunto set  
my hand this 4th day of February, A. D. 1886.

DAVID BROSE.

Witnesses:

W. B. CORWIN,  
THOMAS W. BAKEWELL.