

UNITED STATES PATENT OFFICE.

BENJAMIN TALBOT, OF DARLINGTON, ENGLAND.

PROCESS OF MAKING STEEL AND INGOT-IRON.

985,225.

Specification of Letters Patent.

Patented Feb. 28, 1911.

No Drawing.

Application filed April 4, 1910. Serial No. 553,260.

To all whom it may concern:

Be it known that I, BENJAMIN TALBOT, a British subject, residing at Woodburn, Darlington, county of Durham, England, have
5 invented an Improved Process of Making Steel and Ingot-Iron.

My invention is an improvement on the Bessemer and continuous processes of manufacturing steel and ingot iron.

10 It consists in subjecting unrefined molten metal, taken from a blast furnace, cupola or mixer, to a surface blast, or blast through the upper strata of the metal, by which the bulk of the silicon and a greater or less per-
15 centage of other metalloids are eliminated, with conversion of graphite into combined carbon, and the production of an oxidizing slag; then pouring further metal to be re-
20 fined through the slag of the metal blown and blowing the combined charges to effect the desired oxidation of the contained metalloids, the metal being preferably transferred for final oxidation to a finishing fur-
nace.

25 In practice, a basic lined converter having a capacity of fifty to one hundred tons is preferably employed and an initial charge is introduced of say half the converter's capacity. This metal is subjected to surface
30 blast or a blast directed through its upper strata, which produces considerable oxid of iron slag and agitates the metal, with the elimination of the bulk of the silicon and more or less of the remaining metalloids,
35 and changes to the combined form the bulk of the graphitic carbon not eliminated, the latter change avoiding the foaming and occasional explosions taking place in the treat-
40 ment of liquid metal containing graphitic carbon in finishing furnaces. The initial charge having been thus treated, the further half of the metal is poured through the slag, effecting a precipitation and recovery of
45 iron from the iron oxid in the slag and the oxidation of the metalloids of the added iron. The full charge is now blown until the impurities are eliminated to the extent desired, when a part or all of the metal is
50 tapped in a condition considerably hotter than is usual.

The blowing is effected at a comparatively short distance below the surface of the metal and consequently a low pressure suffices for the introduction of the blast.

55 Preferably part of the metal is tapped

from the converter and the remainder is left for admixture with a further charge of im-
pure metal to be treated.

The practice of the process may be illus-
trated by its application to the treatment of 60
say fifty tons of molten metal containing 3.7% carbon, 1.25% silicon and .8% manga-
nese. Of this metal about twenty-five tons
are run from the blast furnace, mixer or
cupola into the converter and subjected to 65
a surface blast, or blast through its upper strata, until the silicon has been oxidized
down to say .25% or under, the manganese
to say .5% or even traces, and the carbon to
say $\frac{1}{2}$ or $\frac{2}{3}$ the original content, the graphitic 70
carbon which may have been 1% having
been reduced to the combined form. The
above conditions having been attained, the
remainder of the charge, consisting of about
twenty-five tons of impure metal, is run 75
into the bath. More or less reaction takes
place and the combined metal is blown until
the silicon has been reduced to .25% or less,
the manganese to .5% or even traces, and
the carbon to about 2.75% or under, the re- 80
maining carbon being practically all in the
combined form, which is of great advantage
in the further treatment in the finishing
furnace. All or part of the metal in this
condition is now tapped and run into the 85
finishing furnace which is advantageously
of the continuous open hearth type, though
an electric or other form of finishing fur-
nace may be employed.

Having described my invention, I claim: 90

1. The process of manufacturing iron and
steel which consists in subjecting a charge
of unrefined molten metal to a surface blast
and producing an oxid of iron slag, adding
a further charge of metal to be purified, and 95
blowing the combined charges.

2. The process of manufacturing iron and
steel which consists in blowing the upper
strata of a charge of molten metal, produc-
ing thereby an oxid of iron slag, eliminating 100
the bulk of the silicon, eliminating part of
the carbon and converting the bulk of the
remaining graphitic to combined carbon,
then adding further impure metal and blow-
ing the combined charges. 105

3. The process of manufacturing iron and
steel which consists in placing a charge of
unrefined metal in a converter, subjecting
said metal to surface blowing so as to pro-
duce an oxidizing slag and eliminate the 110

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bulk of the silicon with more or less of the
ether metalloids, adding a further charge of
unrefined metal to the bath and blowing the
combined charges, tapping metal from the
5 converter and subjecting it to further treat-
ment in a finishing furnace.

In witness whereof I have hereunto set

my name this 2nd day of April, 1910, in the
presence of the subscribing witnesses.

BENJAMIN TALBOT.

Witnesses:

ROBERT JAMES EARLEY,

JOS. G. DENNY, Jr.