

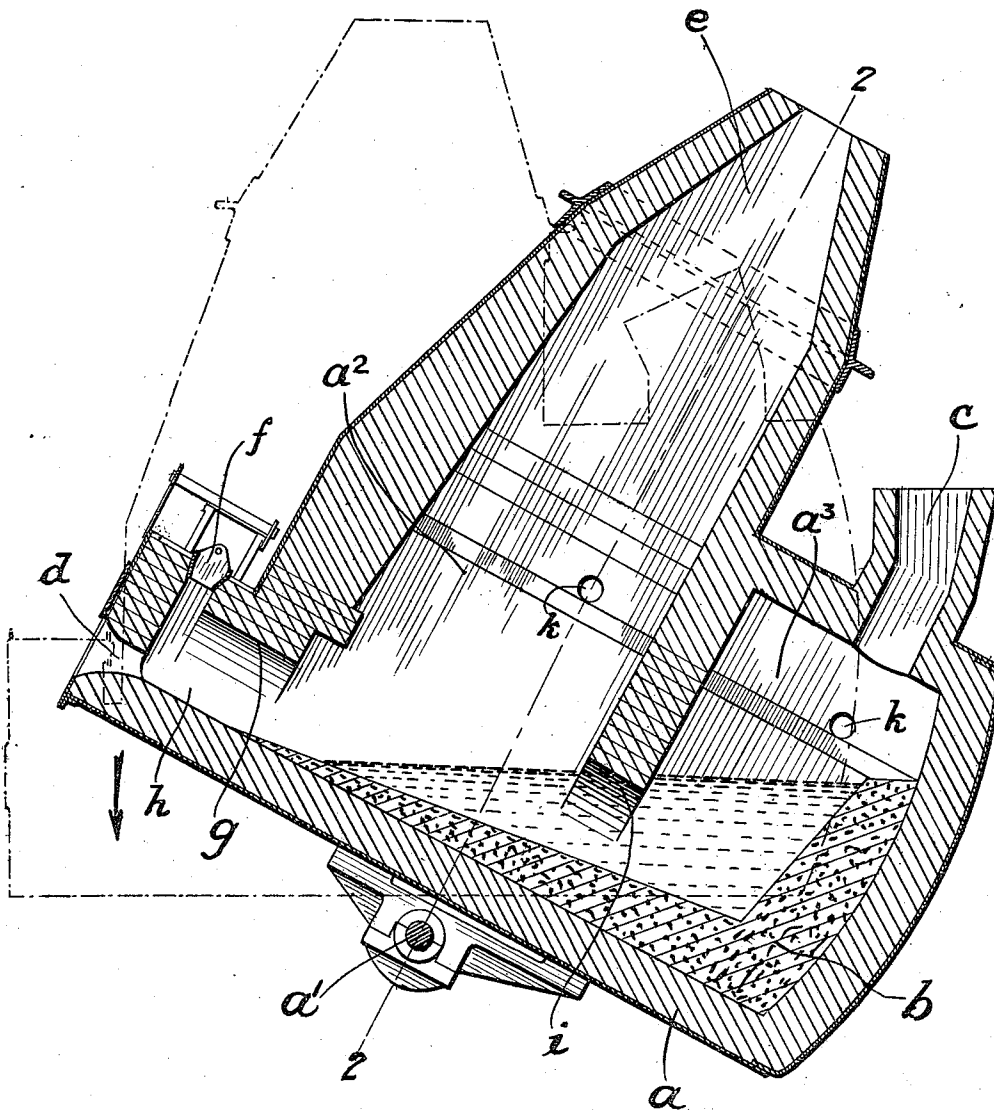
B. TALBOT.
 CONVERTER OR VESSEL FOR REFINING IRON AND STEEL.
 APPLICATION FILED APR. 4, 1910.

990,313.

Patented Apr. 25, 1911.

2 SHEETS—SHEET 1.

FIG. 1.



WITNESSES:

Wm. H. Kitchel
Jos. S. Dunning Jr.

INVENTOR

Benjamin Talbot
 BY *Charles D. Butler*
 ATTORNEY,

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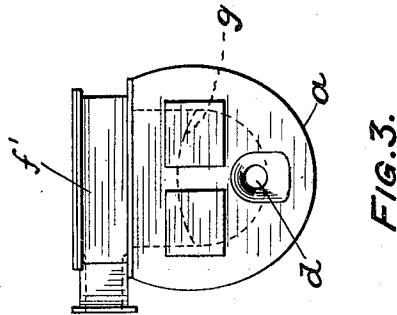


FIG. 3.

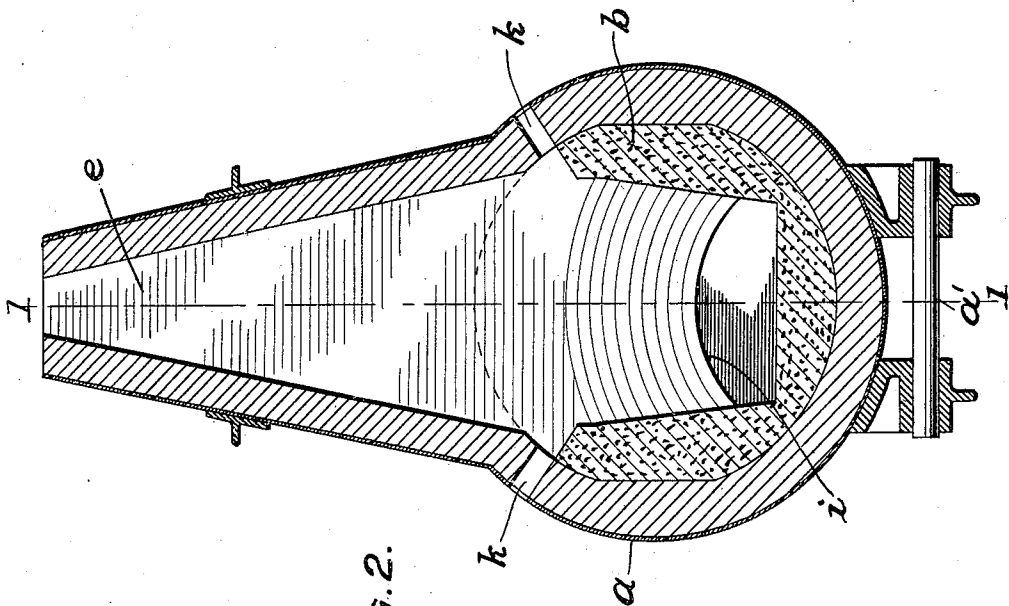


FIG. 2.

WITNESSES:

Wm. R. Kitchel.
Geo. B. Penny Jr.

INVENTOR

Benjamin Talbot
 BY *Charles H. Butler*
 ATTORNEY

UNITED STATES PATENT OFFICE.

BENJAMIN TALBOT, OF DARLINGTON, ENGLAND.

CONVERTER OR VESSEL FOR REFINING IRON AND STEEL.

990,313.

Specification of Letters Patent.

Patented Apr. 25, 1911.

Application filed April 4, 1910. Serial No. 553,259.

To all whom it may concern:

Be it known that I, BENJAMIN TALBOT, a British subject, residing at Woodburn, Darlington, Durham county, England, have invented certain Improvements in Converters or Vessels for Refining Iron and Steel, of which the following is a specification.

My improvements are designed to provide a converter or vessel of the Bessemer type in which the impurities in the crude molten metal may be removed, at least to a very large extent, by the oxidizing action of an air blast, and if such removal is insufficient for the desired finished material, the partially purified metal will be peculiarly well adapted, owing to its great heat and the removal of some of its impurities, for final treatment in an open hearth or other finishing furnace.

My improved converter or vessel combines in its construction characteristic features of the bottle shaped Bessemer converter and the normally inclined mixer, with twyers or blast inlets discharging above, at or only slightly below the level of the bath of contained metal. It preferably has its various openings so situated that during the blowing operation the twyers or blast ports are only slightly covered by the metal and the direction of the blast through the metal is not that of the gas outlet. It is adapted to be tipped so as to elevate the blast ports to permit the blast to be admitted at or near the top of the metal bath and also at lower levels beneath the surface of the metal in process of treatment.

It will be understood that my converter or vessel differs, in regard to the position of its twyers and the pressure required for introducing the blast, from the Bessemer converter, in which the twyers are at the bottom of the vessel far below the level of the metal and a high pressure air blast is required to sustain the weight of a comparatively deep column of metal.

The characteristic construction and functions of my invention are disclosed in the following description and the accompanying drawings in illustration thereof.

In the drawings, Figure 1 is a longitudinal section of apparatus embodying my improvements, taken on the line 1—1 of Fig. 2; Fig. 2 is a transverse section of the same taken on the line 2—2 of Fig. 1; and Fig. 3 is a front elevation of a detail thereof.

In the drawings, the converting vessel *a*

has a basic lining *b* of dolomite and tar or other suitable material, the vessel having the general form of a normally inclined mixer with its top inlet *c* for the molten metal at its large end and the tapping hole *d* at its small end. With this is combined that part of the bottle Bessemer form of converter consisting of the neck *e* which in this case acts to discharge the gases only, such neck being situated at a convenient position between the two ends. Above the tap hole *d* are the twyers or blast inlets *f* which lead from the blast box *f'* through, or form a continuation of, an arch *g* at a level normally above that of the bath or liquid metal, the converter being tipped down to draw the metal into the nose *h* which directs the blast along the surface of the metal.

When it is desired to blow the metal, the converter, which is adapted to rock on the bearing *a'*, is tipped down in the direction of the arrow, Fig. 1, (the tap hole *d* being of course plugged) until the level of the metal reaches or covers the twyer inlet *f* or covers the arch *g*. The blast is then admitted and the gases generated by the oxidation of the impurities escape through the neck *e*.

Between the neck *e* and the metal inlet *c* it is convenient to form in some cases a low arch *i*, which may be of any suitable material such as magnesite, and which extends downwardly to a point near or below the level of the bath so as to prevent in this case the gases from escaping largely by the metal inlet *c*.

The arch *i* divides the vessel *a*, when the arch is covered by the bath, into two chambers *a²* and *a³*, the chamber *a²* being fully exposed to the action of the blast while the chamber *a³* is very little exposed, if at all, so that the reaction in the latter will be very slight.

With the construction indicated, which provides an extended and comparatively shallow hearth preferably of greater length than depth, oxidation can be effected with a low pressure blast, and the air will be caused to travel over a large surface transverse to the gas outlet or outlets, as distinguished from having to travel through a considerable depth of metal in the direction of the gas outlet. It will also be possible to remove not only the silicon but a large part of the carbon without the slag and without a part of the metal being projected from the con-

verter while the carbon is being oxidized, as is sometimes the case, particularly where the direction of the blast is in or approaches the direction of the gas outlet.

5 A converter as above described can, of course, be emptied after each charge has been blown; but it will usually be preferable to work it on the continuous system by first purifying a portion of the charge and then
10 adding further unrefined metal, purifying the combined bath, partially discharging and again adding to the remainder unrefined metal. By this means the slag formed can be run off as desired without unduly
15 impregnating the bottom lining. It will be found that the partition of the bath by means of the arch *i* into two portions, one of which is fully acted upon while the other portion that is scarcely acted upon is the
20 one nearest to the charging inlet, is of material assistance to the continuous process.

By means of the improved apparatus there are thus obtained the combined advantages of the Bessemer system and of the continuous system.

25 In order to prevent loss of heat by radiation or otherwise, to facilitate the reduction, gas jets *k k* may be employed, or such jets may be useful in the chamber *a*² for
30 melting or assisting the melting of the charge therein, where for instance such charge is partly pig iron.

Having described my invention, I claim:

35 1. A tipping converter having an extended hearth of greater length than depth, a gas outlet between the ends thereof, and a blast inlet disposed at an end thereof so that the metal can be subjected to a surface blast when the converter is tipped down.

40 2. A tipping converter having a hearth, a neck extending transversely thereto between the ends thereof, and twyers in an

end thereof whereby the metal can be subjected to a surface blast when the converter is tipped down.

3. A tipping converter having a shallow hearth with a discharge port at an end thereof and means for introducing blast through the surface of metal above said port when the converter is tipped down.

4. A tipping converter having a hearth with an arched nose and means for delivering a surface blast to the metal on said hearth through said nose.

5. A tipping converter having a hearth, an arch at an end thereof, and a twyer for delivering blast beneath said arch through the surface of metal on said hearth.

6. A tipping converter having an extended hearth, a blast inlet at one end thereof, a charging inlet at the other end thereof, a gas outlet, between said ends, and an arch above said hearth between said outlet and inlet.

7. A tipping converter, adapted for refining iron and steel, having an arch forming two compartments, a second arch, means for delivering a blast beneath said second arch to one of said compartments, a neck leading from said last named compartment, and a charging inlet communicating with the second of said compartments.

8. A tipping converter, adapted for refining iron and steel, having an extended shallow hearth, an arch, an inlet for delivering blast beneath said arch, a neck, and means for introducing gas above said hearth.

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.