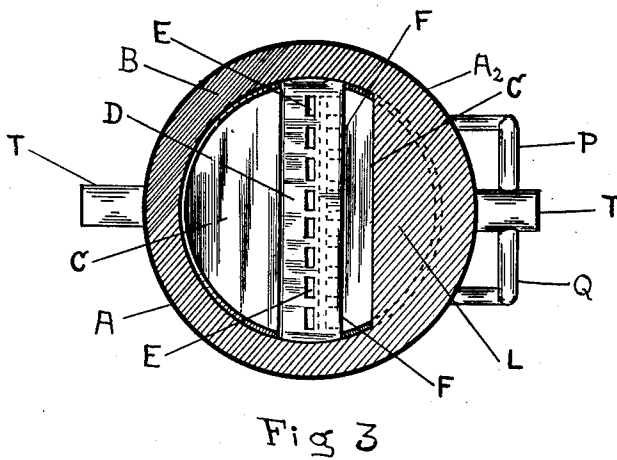
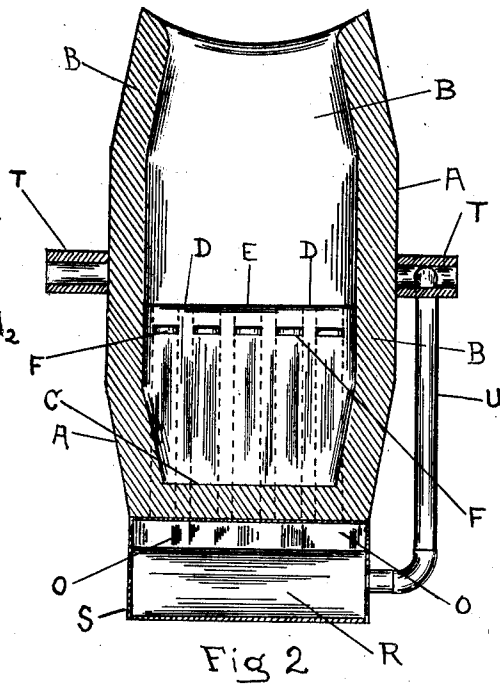
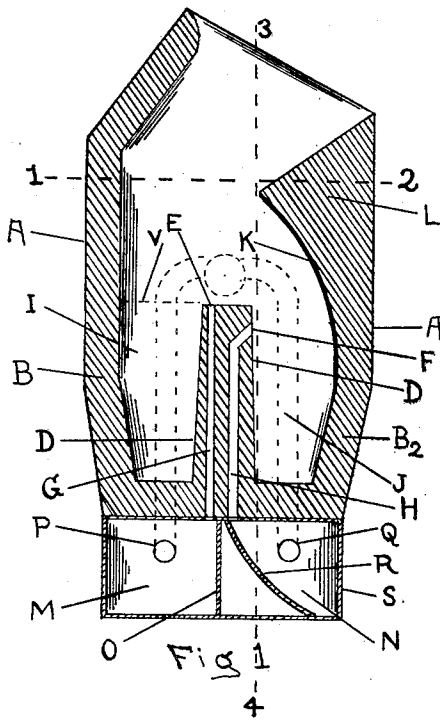


W. B. BURROW.
CONVERTER.

APPLICATION FILED OCT. 14, 1902.

NO MODEL.

2 SHEETS—SHEET 1.



Walter B. Burrow. Inventor

Witnesses
John A. Baecher.
A. J. Smith.

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2 SHEETS—SHEET 2.

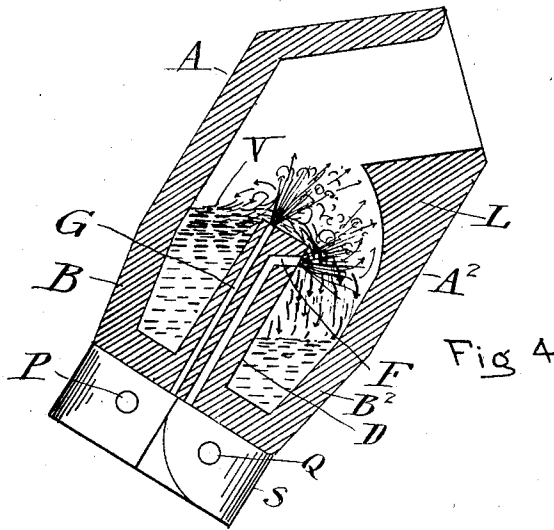


Fig 4

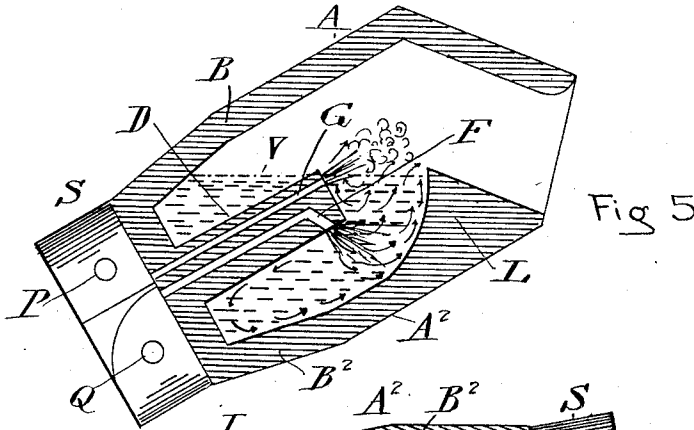


Fig 5

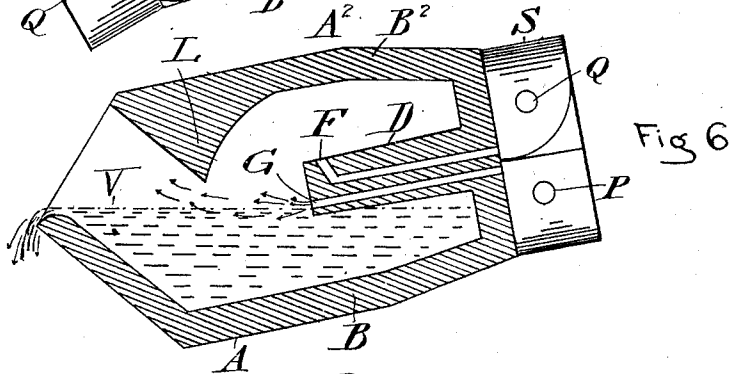


Fig 6

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UNITED STATES PATENT OFFICE.

WALTER B. BURROW, OF NORFOLK, VIRGINIA.

CONVERTER.

SPECIFICATION forming part of Letters Patent No. 737,578, dated September 1, 1903.

Application filed October 14, 1902. Serial No. 127,242. (No model.)

To all whom it may concern.

Be it known that I, WALTER B. BURROW, a citizen of the United States, residing at Norfolk, in the county of Norfolk and State of Virginia, have invented certain new and useful Improvements in Converters for Making Malleable Iron and Steel; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to make and use the same.

My invention relates to converters for making iron and steel by the pneumatic process.

In this converter the metal is blown at different depths or thicknesses to produce various grades of steel and malleable iron. The converting vessel has a vertical twyer wall or dam dividing it into two sections from the bottom or hearth of the converter upward and forms a part of the lining from side to side parallel to the axis of the converter and extending to or near the axis. The twyer wall or dam is provided with twyer or blowpipes on the top or edge, having their direction of discharge vertically toward the converter-outlet, and twyers also in the side or face of the wall with their direction of discharge at an angle upward to the lining opposite the pouring side and impinging on a curved block forming a part of the lining, which will be hereinafter described.

The crude molten cast-iron from the cupola or other furnace is poured in the compartment or receiving-chamber of the converter at the back or pouring side and reaches nearly to the top of the twyer-wall. By tilting the converter as the operation proceeds toward the front or opposite the pouring side the metal flows over the wall in a thick or thin sheet and meeting the blast from the top or straight twyers causes the air to intimately mix and refine every particle of the iron. The blast in this manner cuts the thin wide stream of metal as it passes over the vertical twyers and subjects the metal to a perfect union with the blast. The metal thus treated falls into a collecting-chamber, and when full the vessel can be tilted in the opposite direction and the metal poured back into the receiving-chamber and the process repeated, as required. The angle-twyers can be used either for pulverulent purifying material or gases or as combustion-twyers in conjunction with

the vertical twyer and also for blowing downward into the metal when the converter is tilted at or near its maximum angle when the metal is in the collecting-chamber to give a different grade of product and also to produce a washing action on the curved base of the wedge-shaped projection, as will be hereinafter described.

Referring to the drawings, Figure 1 is a sectional elevation at right angles to the axis of the converter. Fig. 2 is a vertical section through the line 3 4 in Fig. 1. Fig. 3 is a sectional plan through the line 1 2 in Fig. 1. Figs. 4, 5, and 6 are vertical sections in outline, showing the various positions of the converter while in operation, as will be described hereinafter.

A is the converter-shell, and B the refractory lining.

A² and B² represent the shell and lining on the opposite side.

C, Figs. 2 and 3, is the bottom or hearth of the converter.

D is the division or twyer wall, which separates the converter-body from the bottom to the axis into two sections I and J, J being the collecting and I the receiving chamber, into which (I) the metal is poured from the cupola or melting-furnace and is located on the pouring side, as shown.

E represents the vertical twyers having their outlets at the edge of the division-wall and are of one or more rows spaced along the length of the wall parallel to the axis T.

F represents the angle or dephosphorizing twyers and are situated on the sides of the wall D and are directed upward at an angle, the inclination depending on the size of the converter and the position of the wedge-shaped projection L.

G and H are the blast-passages to the twyers and receive the blast from the wind box or reservoir S. The twyers E are supplied from the box M and the twyers F from the box N. The wind-box is divided in the direction of the axis of the converter by the plate O, forming two separate compartments and supplied independently from the trunnions by the pipes P, Q, and U, Figs. 1, 2, and 3. The wind-box compartment N has a curved plate R to guide pulverulent purifying material into the twyers F.

K is a curved overhanging basic projection

formed by the wedge-shaped block L, on which the metal is thrown by the blast from the twyers F, causing a close union with the basic material and producing a dephosphorizing effect.

V, Fig. 1, is the metal surface when commencing the operation.

Fig. 4 shows the beginning of the process, in which the metal is pouring over the wall D and into the chamber J after being acted on by the fining-twyers E and the dephosphorizing-twyers F. In this case either the twyers F can carry pulverulent purifying material with the blast or as combustion-twyers in combination with the fining-twyers E.

Fig. 5 is a view showing a greater angle of the converter than that shown in Fig. 4, and the twyers F are blowing downward into the metal of a greater body or thickness and washing it against the curved base of the wedge-shaped projection. The twyers E are blowing a thin layer of metal and ejecting the slag over the edge of the projecting block.

Fig. 6 is the last or pouring position assumed by the converter. In this the twyers F are cut off, and the twyers E are blowing the surface of the metal, clearing it and at the same time finishing the last stage of the decarbonization, after which the twyers E are cut off and the metal poured into molds. The thickness of the sheet of metal pouring over the twyer-wall, as shown in Fig. 4, is regulated by the speed at which the converter is tilted. This converter produces a uniform iron and steel and is very hot. As the blast comes in contact with the thin sheet of metal as many times as desired and at a very rapid rate, a great many varieties of steel can be made, which will be suitable for castings and be comparatively free from imperfections. The wedge-shaped projection L is a part of the lining and is of a basic character and extends from the twyer-wall to the nose or outlet of the converter opposite the pouring side, and the curved portion or base being in the direction of the length of the converter also corresponding to the circular shape of the body, and thus forms a hollow or cavity for the metal to be thrown or dashed against and by the erosion of the basic particles causes it to mix and refine the metal. The converter can be lined with ganister or other acid material, in which case the twyers F act as combustion-twyers and assist in the conversion. The blast is controlled by suitable valves placed in the feed-pipes at convenient points to regulate the pressure from the trunnions or axis and so that either or both sections of the wind-box can be cut off or on.

The advantage of this invention is that the process can be carried out in a very short time, and any degree of refining and decarbonization can be effected by a repetition of the different stages, as described. The converter can be modified to suit conditions and

will turn out many grades of casting metal, which will be solid and free from defects and impurities.

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

1. In a tilting, movable converter for making malleable iron and steel, having a vertical upward-tapering refractory twyer wall or dam dividing the body of the converter into two separate halves, extending from side to side, attached to and forming a part of the lining parallel to the axis or trunnions of the converter and projecting upward from the bottom or hearth to or near the said axis, as described.

2. In a tilting movable converter or vessel for making iron and steel, having its body divided into two distinct parts by a refractory wall from the bottom of the converter upward to the axis and extending from side to side in the direction of the said axis, and the dividing-wall or partition having a plurality of vertical twyers on the edge or top of the wall and twyers on the side of same, having their direction of discharge at an angle upward on a hollow refractory projection or block overhanging the bottom of the converter opposite the pouring side, as described.

3. In a tilting converter, the combination of a refractory division-wall from the bottom upward in the direction of the axis and a plurality of vertical twyers on the edge, and angle-twyers, discharging toward the outlet of the converter, on the side or face, and a curved projection or overhanging refractory block forming a hollow or cavity for the impinging of the angle-twyers and forming part of the lining, as described.

4. In a tilting converter having a dividing-wall across its body parallel with the axis extending from the bottom upward, and vertical twyers through the body of the said wall having their outlets at the top or edge of the wall or dam, and twyers in the side of the said wall discharging at angles upward on the lining opposite the pouring side and a refractory overhanging wedge-shaped projection occupying the pouring side and forming a hollow or concavity in the lining, and a wind or twyer box on the bottom of the converter, having a division-plate or partition parallel with the axis of the converter and a deflecting-plate in the section opposite the pouring side, to supply the said sets of twyers independently with the blast from the trunnions or axis, as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WALTER B. BURROW.

Witnesses:

JOHN A. BAECHEK,
ANTONIO J. SMITH.