(No Model.) 2 Sheets—Sheet 1.

W. M. MURDOCK.

CONVERTER.

No. 335,613. Patented Feb. 9, 1886.

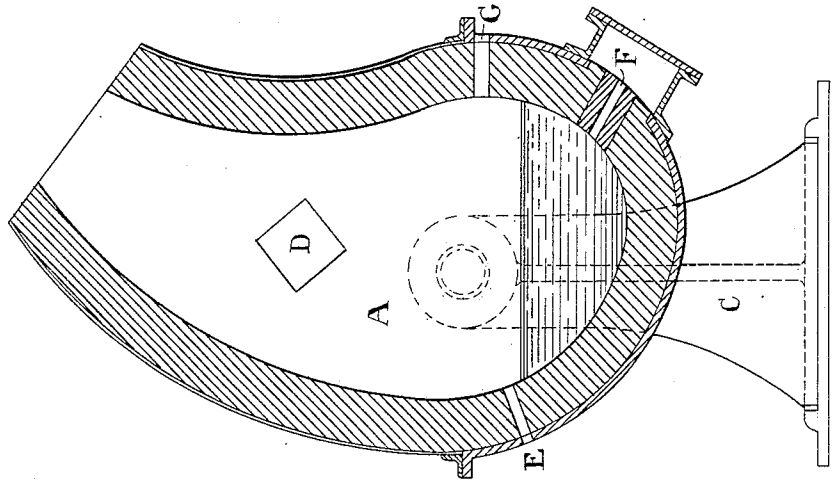


Fig. 2.

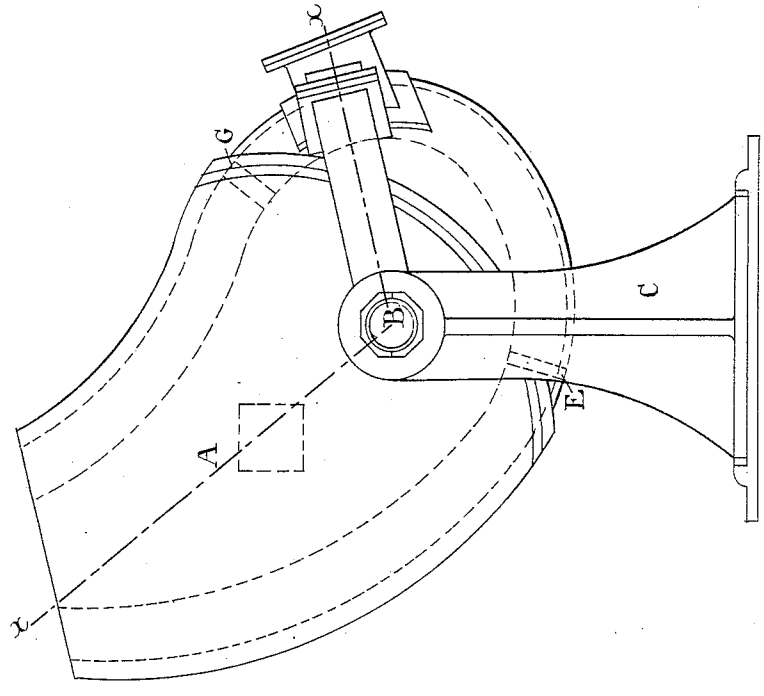


Fig. 1.

Witnesses.
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L. C. Fisler

Inventor.
William Mallabey Murdock
by his attys
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N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.)

2 Sheets—Sheet 2

W. M. MURDOCK.

CONVERTER.

No. 335,613. Patented Feb. 9, 1886.

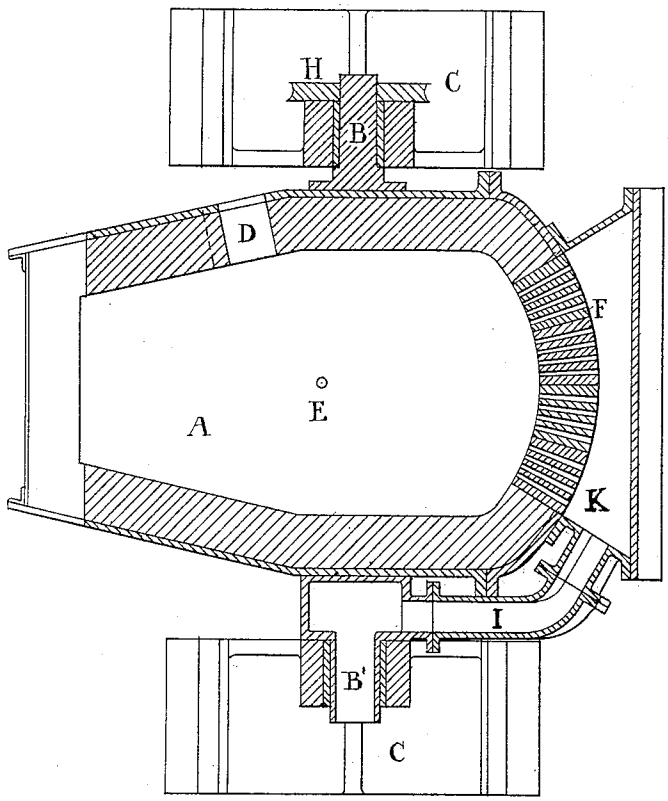


Fig. 3.

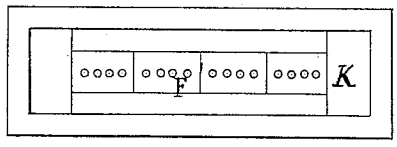


Fig. 4.

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UNITED STATES PATENT OFFICE.

WILLIAM MALLABEY MURDOCK, OF GILWERN, COUNTY OF BRECON, ENGLAND, ASSIGNOR TO HENRY W. OLIVER, JR., AND JAMES PORTER WITHEROW, OF PITTSBURG, PENNSYLVANIA.

CONVERTER.

SPECIFICATION forming part of Letters Patent No. 335,613, dated February 9, 1886.

Application filed September 8, 1883. Serial No. 105,875. (No model.) Patented in England May 2, 1883, No. 2,227.

To all whom it may concern:

Be it known that I, WILLIAM MALLABEY MURDOCK, a subject of the Queen of Great Britain, residing at Gilwern, in the county of Brecon, Principality of Wales, Great Britain, have invented certain new and useful Improvements in Converters Employed in the Manufacture of Malleable Iron and Steel, (for which invention I have applied for Letters Patent in England, my application being dated May 2, 1883, and numbered 2,227;) and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention relates more particularly to that class of converters which are mounted on trunnions and are turned up after charging, so as to bring the molten metal over the blast-tuyeres. According to the usual method of tapping or discharging such converters, they are tipped up and the metal poured through the mouth thereof, thus passing over the slag and other impurities collected in and adhering to the neck of the converter, and therefore re-oxidizing and causing deterioration of such metal. I attain these objects in the manner illustrated by the accompanying drawings, in which—

Figure 1 is a side elevation of a converter constructed according to my invention, and shows it to be in position for receiving the charge of molten metal. Fig. 2 is a similar view to Fig. 1, but is shown in section, and also in the position required for a "blow"—that is, turned up with the tuyeres under the surface of the molten metal. Fig. 3 is a sectional plan taken on line *x x* of Fig. 1; and Fig. 4 is a back elevation of the tuyere-box with the lid removed, so as to show the position of the tuyeres.

Similar letters refer to similar parts throughout the views.

A is the converter mounted upon trunnions B B', supported in bearings at the top of the standards C C.

D is a door, through which the molten metal is charged into the converter, and E is a tapping-hole, through which such metal is tapped out, instead of being run out at the mouth of the converter.

In order to tap the metal through the hole E, the converter is tipped back somewhat lower than the position necessary for charging.

F are the tuyeres, the holes of which are arranged in a horizontal (or approximately horizontal) line with one another, so that they may all be moved down to any desired level below the surface of the molton metal to suit any pressure of blast. The tuyeres are arranged in the sides radially (or approximately so) to the center of the converter, as shown at Figs. 1 and 3, or the tuyeres near the sides only may be set to blow at an angle inward. The blast is supplied through the hollow trunnion B', whence it is conducted by a pipe, I, to the wind-box K, from which the tuyeres F extend into the converter.

G is a slagging-hole, through which the slag flows off during the blow, the slagging-hole being arranged in the side above the tuyeres and above the metal-line, as shown in Fig. 2, so that when the charge swells and rises in the converter during the operation the slag floating on top of the same will flow out through the slagging-hole, and thus be separated from the metal, and all danger of the impurities contained therein reuniting with the metal be obviated.

It is apparent that the slagging-hole can be used with converters which are charged and discharged through the mouth with the same advantage; but in the latter case the metal may take up some of the impurities which collect in and adhere to the neck, and consequently it is not so good a construction as when a separate tapping-hole is used.

The separation of the charging, tapping, and slagging holes enables each to perform its appropriate functions more perfectly.

When the slagging-hole is used in a tipping converter, the slagging off may be aided, and consequently more perfectly accomplished, by moving the vessel to vary the height of the slagging-hole above the charge, as the circumstances of the operation and the desire for a more or less perfect separation of the slag may dictate. The tuyeres are arranged in the side, so that when in a blowing position they converge both radially and upwardly toward the center of the vessel, whereby the blast therefrom will not impinge on the lining and cut and waste it.

H is a worm-wheel, which is operated by

means of a worm (not shown) to tip the converter when of a small size, in lieu of the more expensive hydraulic apparatus necessary for the larger-sized converters. The tuyeres in the construction shown are arranged partially around the converter, and the tapping-hole is on the opposite side. By this arrangement the tapping-hole is brought under the metal when the tuyeres are raised out of it. In the same way the slagging-hole is arranged opposite to the tapping-hole, so that when the tapping-hole is in use the slagging-hole will be turned up out of the way.

The use of the slagging and tapping holes in a tipping converter secures the automatic discharge of the cinder and metal, while it does not interfere with its peculiar functions, so that I overcome the disadvantages and retain all the advantages of the tipping converter. In addition to this, I enlarge its usefulness, because more varied and extended processes may be carried on in such a converter than in either an ordinary tipping or a fixed converter.

Having now described my said invention, I declare that what I claim as such invention, and desire to secure by Letters Patent, is—

1. A converter employed in the manufacture of malleable iron and steel, provided with a charging-hole, a tapping-hole, and a slagging-hole, each separate from the others, substantially as and for the purposes described.

2. A tipping converter provided with a slagging-hole, substantially as and for the purposes described.

3. A tipping converter provided with a wind-box and tuyeres, a hollow trunnion connected with and supplying the blast to the wind-box, and a slagging-hole arranged above the tuyeres, substantially as and for the purposes described.

4. A tipping converter having a slagging-hole and a tapping-hole, said holes being arranged on opposite sides, substantially as and for the purposes described.

5. A tipping converter having tuyeres and a slagging-hole arranged on one side and a tapping-hole on the other, substantially as described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

WILLIAM MALLABEY MURDOCK.

Witnesses:

STEPHEN WATKINS,

JOHN THOM.