(No Model.)

J. F. WILCOX.

CONVERTER.

No. 314,551. Patented Mar. 24, 1885.

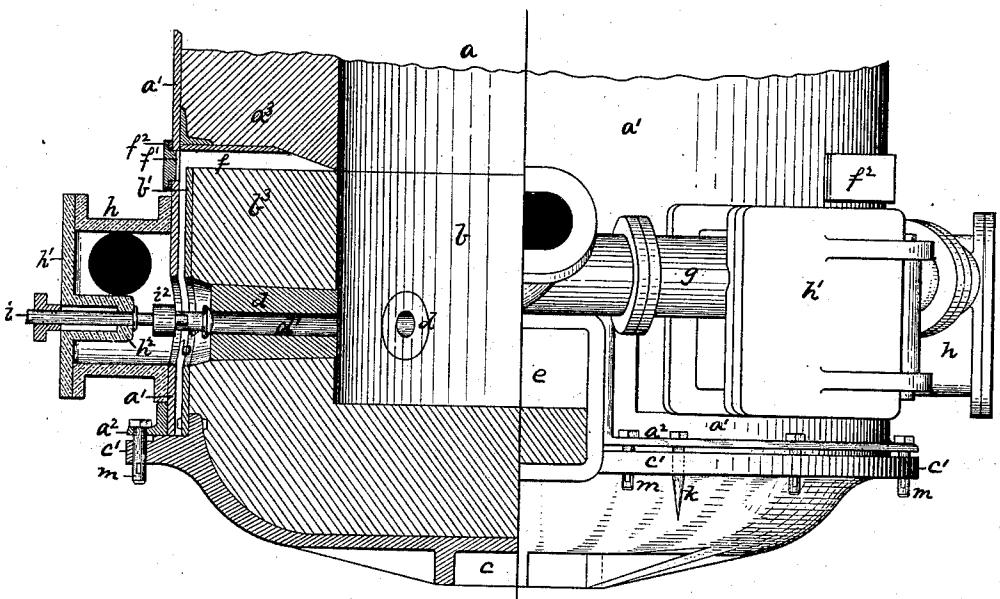


Fig. 1.

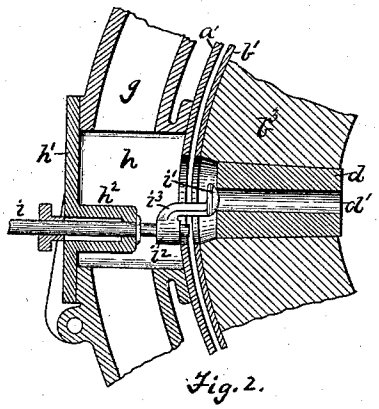


Fig. 2.

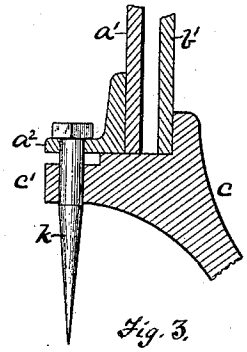


Fig. 3.

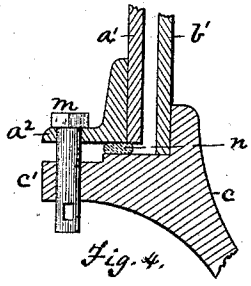


Fig. 4.

Witnesses.
J. A. Burns,
Harry L. Gill.

Inventor.
John F. Wilcox,
by his attys
Bakewell & Kerr

N. PETERS. Photo-Lithographer. Washington, D. C.

UNITED STATES PATENT OFFICE.

JOHN F. WILCOX, OF PITTSBURG, PENNSYLVANIA.

CONVERTER

SPECIFICATION forming part of Letters Patent No. 314,551, dated March 24, 1885.

Application filed December 10, 1884. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. WILCOX, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Converters; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to that class of converters used for treating molten metal which are provided with tuyeres having external stoppers for controlling the blast of air which enters the converter. These converters are usually made with a removable bottom section for convenience in renewal and repairs. The tuyeres are arranged in the sides of the removable bottom section, and a wind box or chamber communicating with the tuyeres either extends around and is secured to the outer shell or each tuyere is supplied with a separate wind box or chamber, which is connected with the wind-trunk or main blast-pipe on the upper section of the converter by vertical blast-pipes. In one construction of these converters the stoppers are operated in one direction by steam cylinders and pistons attached to the removable bottom, which cylinders are supplied with steam by vertical pipes from a steam-pipe supported on the upper or stationary part of the converter. In another construction they are operated by levers attached to the removable bottom and actuated by rods or chains, also supported on the upper part; and in still another construction they are operated by an electro-magnet or a helix, the electric current being supplied by circuit-wires also supported on the upper part. Practical experience has demonstrated the fact that frequent removals of the bottom for the purpose of renewing the lining or repairing the tuyeres and other repairs are necessary. In the use of the construction mentioned such removals involve considerable time, labor, and care in disconnecting and connecting the blast-pipes and the pipes or other devices supported on the upper part, which constitute part of the means employed for operating the tuyere-stoppers. The loss of time in taking out a defective bottom and inserting a new one in a converter when in use, caused by these details of construction, is a matter of considerable moment, while there is always liability of imperfect connections in the haste and excitement consequent on a change at such a time, entailing a danger to the converter and necessitating its stoppage. The object of my invention is to enable such a change to be easily and quickly made, and to obviate the necessity of disconnecting the blast and stopper appliances.

To enable others skilled in the art to make and use my invention, I will now describe it by reference to the accompanying drawings, in which—

Figure 1 is a view of the lower end of a converter, partly in section, illustrating my invention. Fig. 2 is a horizontal section of one of the tuyeres with its air-chamber and stopper. Figs. 3 and 4 are views of details of construction.

Like letters of reference indicate like parts in each.

The converter is composed of an upper or fixed part, *a*, which has a metal shell, *a'*, extending down below its lower end a sufficient distance to receive and support the removable lower part or bottom, *b*. The bottom *b* is provided with a metallic shell, *b'*, which is of such diameter as to permit it to pass up inside of the lower end of the shell *a'*. It is also provided with a bottom casing, *c*, having a flange, *c'*, extending around its outer edge for the purpose of securing it by cotter-bolts or other suitable means to the flange a^2 on the lower end of the shell *a'*. The lower part or bottom, *b*, contains the tuyeres *d* and the metal tap-hole *e*, the shell *b'* being provided with openings b^2 opposite the outer ends of the tuyeres.

Between the lining a^3 of the upper section, *a*, and the lining b^3 of the lower section, *b*, of the converter is a narrow opening or recess, *f*, extending entirely around the converter, which is designed to contain a luting of ganister or other suitable material, so as to form a tight joint between the two parts. As stated, the form of this opening in cross-section is such that when the two parts *a b* are brought together the inner edge of the opening *f* will be entirely closed by the contact of the parts *a b;* but I do not limit myself to any particular form for the opening *f*, as any

that will secure a tight joint will answer for the purpose.

In the shell a', at suitable intervals in the circumference, are holes f', closed by doors f^2, which are for the purpose of permitting the insertion of a crow-bar or other suitable instrument for prying the parts $a\,b$ apart in case they stick when it is desirable to remove the bottom part.

All appliances for conducting the blast to the tuyeres and for sustaining and operating the stoppers are attached to or supported by the shell a' of the upper or stationary part of the converter. Of these devices g is an air-trunk or main blast-pipe, which extends entirely around the converter, being broken at intervals, however, by air-chamber h, opposite the outer end of the tuyeres. The chambers h are provided with doors h' for the purpose of giving access to the same, and extending through a stuffing-box, h^2, attached to each door, is the stem i, upon which the stopper i' of that tuyere is mounted. The stopper i' is mounted on the stem i by means of a loose sleeve, i^2, and has a short axial movement upon the stem, and is connected therewith by a curved arm, i^3. It is brought into place in front of the bore d' of the tuyere by turning the stem radially in its stuffing-box, and when once in proper position is forced to its seat by the pressure of the blast behind it. These stems are all connected together by a suitable arrangement of levers, which causes them to be operated simultaneously to open or close the tuyeres at pleasure. These operating devices, not being necessary to the proper illustration of this invention, are not shown in the drawings. I will state, however, that they are all supported upon the shell of the upper or fixed portion, a, of the converter.

In the flange a^2 are a number of dowel-pins, k, which extend downward and enter into suitable holes in the flange c', as illustrated in Fig. 3, so as to guide the bottom section, a', to its proper position to be secured by the cotter-bolts m.

The bottom section, b, is raised into position in the shell a' by a hydraulic lift or jack or other suitable means, and is then secured in place by the bolts m. Before being put into position a sufficient quanty of plastic ganister or other suitable luting material is placed on the upper end of the lower section, so that when such end comes in contact with the lower end of the upper section, a, the luting material shall be compressed between the meeting ends of the sections and form a tight joint. When it is desired to remove the bottom section, the blast is shut off, the doors h' are thrown open for the purpose of withdrawing the stopper i out of the tuyere-openings, the bolts m are removed, and the bottom is then lowered by means of the hydraulic jack. If the parts a and b have stuck together by the baking of the luting in the joint between them, the doors f^2 are opened, and they are pried apart by means of a crow-bar or other suitable instrument through the holes f'.

By the use of this improvement I obviate all necessity for disconnecting any parts of the apparatus except the lower section of the converter. All other appliances remain intact, so that the time and labor of removing a bottom and inserting a new one is reduced to a minimum, and all danger to the converter or any of its parts by reason of imperfect or hastily-made connections hereinbefore specified is obviated. When the converter and its bottom are new, the joint between the flanges a^2 and c' will be sufficiently tight to prevent the escape of the air from between the shells a' b'; but in time the shells, and particularly that of the lower section, become warped by use, and by the heating of the lower section, to which it is exposed in baking or drying the lining, so that a packing is necessary to be used between the flanges in or to make a tight joint. For this purpose I prefer to use a rope or packing, n, of asbestus or other equivalent material; or, if desired, loam or clay may be used for this purpose; but it is not so easy to keep in shape as the asbestus packing.

I do not desire to limit myself to any particular form or construction of parts that go to make up my invention so long as they have the general characteristics and perform the functions of those herein described.

When I speak of a "fixed" part in connection with the upper section, a, I mean only a part which remains in position, while the lower part, b, is capable of being removed therefrom, and not necessarily a part which is permanently attached or incapable of movement in itself or in connection with the other parts of the structure.

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

1. The combination, in a converter, of an upper section having a downwardly-projecting shell with a removable lower section sliding within the shell of the upper section, substantially as and for the purposes described.

2. The combination, in a converter, of an upper section provided with a downwardly-projecting shell and a flange at its lower end with a removable lower section which is insertible within said shell and is provided with a flange around its lower end, and means for securing the parts together by the flanges, substantially as and for the purposes described.

3. A converter formed in two sections, one sliding within the shell of the other, provided with openings in the shell opposite the joints between the parts, said openings having suitable doors, substantially as and for the purposes described.

4. A converter formed in two sections, one sliding within the shell of the other, and secured by meeting flanges, one of which is pro-

vided with dowel or guiding pins, and the other with holes for receiving the same, substantially as and for the purposes described.

5. A converter formed in two sections, one sliding within the shell of the other, and secured by meeting flanges provided with a suitable packing, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 9th day of December, A. D. 1884.

JNO. F. WILCOX.

Witnesses:
W. B. CORWIN,
THOMAS B. KERR.