H. Chisholm,

Manf. Bessemer Steel.

No. 111,815. Patented Feb. 14. 1871.

Fig. 1.

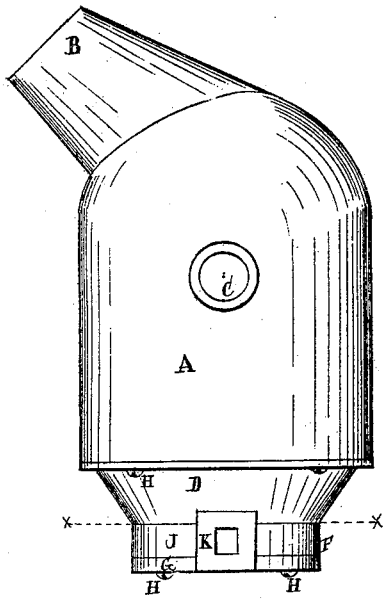


Fig. 2.

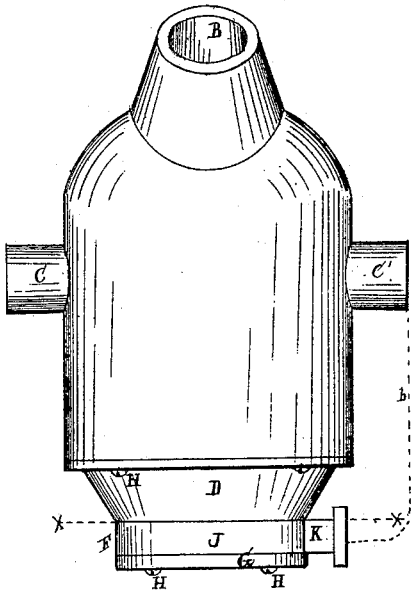


Fig. 5.

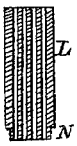


Fig. 3.

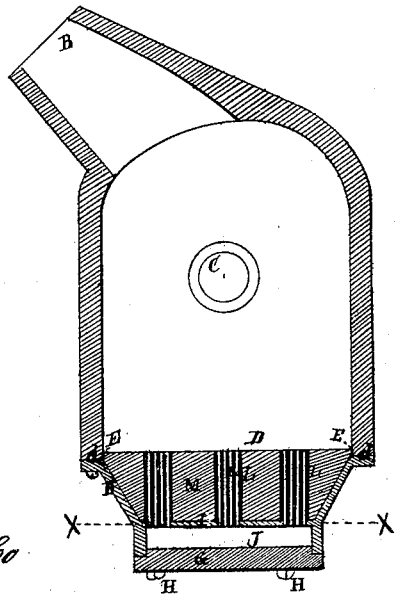
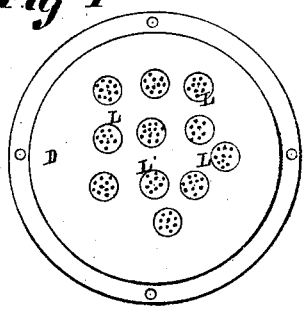


Fig 4



Inventor.

H. Chisholm.

per Burridge & Co

Attorneys

Cleveland O.

Witnesses.

J. H. Burridge.

W. L. Humphrey

UNITED STATES PATENT OFFICE.

HENRY CHISHOLM, OF CLEVELAND, OHIO.

IMPROVEMENT IN APPARATUS FOR THE MANUFACTURE OF BESSEMER STEEL.

Specification forming part of Letters Patent No. 111,815, dated February 14, 1871.

To all whom it may concern:

Be it known that I, HENRY CHISHOLM, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented new and useful Improvements in Converting-Vessels for the Manufacture of Steel, of which the following is a full and complete description, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a side view of a converting-vessel. Fig. 2 is a front view of the same. Fig. 3 is a vertical transverse section. Fig. 4 is an inside view of the bottom of said vessel. Fig. 5 is a detached section.

Like letters of reference refer to like parts in the several views.

The nature of this invention relates to a converting vessel or retort, into which the molten iron from the furnace is received for being treated for its conversion into steel; and the object sought for is to so construct said vessel that free and convenient access can be had to the inside for preparing it for use and repairs, &c., as hereinafter more fully described.

In the drawings, Fig. 1, A represents the body of the vessel, of which B is the mouth, and C the trunnions, on which it is hung and revolved. D is the bottom, which is secured to the lower edge of the body by the screw-bolts H. The bottom is so fitted to the body that a section of its thickness enters within the rim of the edge, as shown at E, Fig. 3. The joint is made tight by luting at *d* and E, which luting is made of suitable fire-clay, and laid on in place before the body A and section D are united. The shape of the bottom is that of an inverted truncated cone down to the line *x x*, from which line it proceeds downward with parallel sides F, to the lower end of which is fitted a bottom, G, in like manner as the cone-shaped bottom D, and secured thereto by screw-bolts H.

I, Fig. 3, is a diaphragm, between which and the bottom G is formed an air-chamber, J, Fig. 4, communicating with the outside by means of a flanged pipe, K, the purpose of which will presently be shown.

L, Fig. 3, are air pipes or tuyeres, a detached view of which is shown in Fig. 5. Said tuyeres consist of a number of small flues, as shown in Figs. 4 and 5, and which are constructed of fire-clay. The upper end of said tuyeres opens into the body of the vessel, whereas their lower end penetrates the diaphragm I and opens into the air-chamber referred to. The lower end of the tuyeres is shouldered, as shown at N, Fig. 5, and rests upon the diaphragm, whereby they are supported. The end below the shoulder being smaller is inserted in holes provided for their admission. The space surrounding said tuyeres is filled up with compact fire-clay, which, together with the tuyeres, constitutes the floor or bed M of the vessel, and upon which the molten iron is received. The trunnion C' is hollow, and is connected to the pipe K by means of a pipe indicated by the dotted lines *b*. Through said trunnion and pipe the air for treating the molten iron is conveyed into the chamber J, thence through the tuyeres L into the body of the vessel.

The operation of this vessel in connection with the furnace is as follows: The molten iron is run from the furnace into the vessel, then converted into steel and cast into ingots in the ordinary way.

Converting-vessels as usually made are found to be difficult to obtain access to the inside of them for lining or repairs. The sections composing them are taken apart, and the inside work is done by reaching therein from the outside or by going into the vessel, which is not only a matter of much trouble, but it is also one of great inconvenience, and which cannot be done at all before the vessel has become cold, which usually takes some twenty-four hours. To avoid this trouble and the loss of time in cooling off the vessel is the purpose of constructing the vessel in the manner as above described. The body of my retort or vessel, as will be seen, is one entire piece, with no joint at or near the trunnions. Access is had to the inside by taking off the entire bottom D, leaving the shell or body open below, so that the workmen can readily and easily perform all the work that may be required to be done on the inside with greater advantage and dispatch than could be were the work done in the ordinary way. The bottom being removed, the tuyeres and filling surrounding them, forming the bed M, are in the most favorable position for making all needful repairs, which, being done, it is easily replaced and the joint E *d* made tight by luting, as before stated.

Should the bottom or bed of the vessel only need repairing, it is not found necessary to

wait until the vessel has become quite cold, for said bottom can be removed while the vessel is yet hot, and the work of repairing be proceeded with at once, thereby causing but little delay in the use of the vessel. So, also, can the walls of the vessel be repaired with equal dispatch, as the large opening at the bottom offers ample room to the workmen to reach in with their implements to mend up any weak or broken places in the lining while the vessel is yet of considerable heat.

As above said, the bottom D is so fitted to the vessel that a section of its thickness enters within the edge of the rim, as shown in Fig. 3. This, however, need not necessarily be, as the floor of the bottom may be just even with the edge of the rim, and then luted for making tight the joint.

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

The combination of the body A and section D, (containing the tuyeres, air-chambers &c.,) constructed and arranged in relation to each other, substantially as and for the purpose specified.

HENRY CHISHOLM.

Witnesses:
W. H. BURRIDGE,
J. H. BURRIDGE.