

(No Model.)

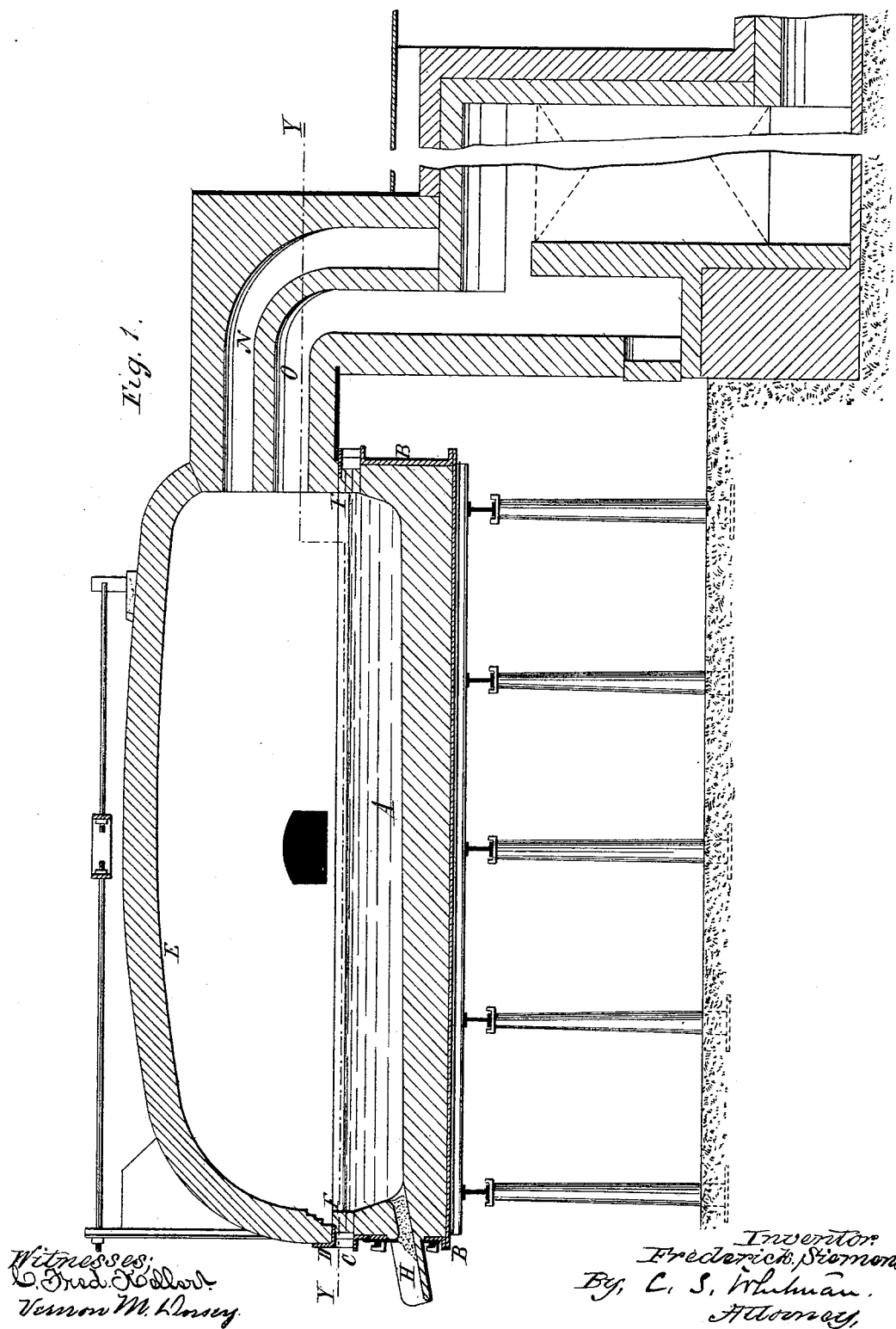
F. SIEMENS.

4 Sheets—Sheet 1.

OPEN HEARTH FURNACE.

No. 386,935.

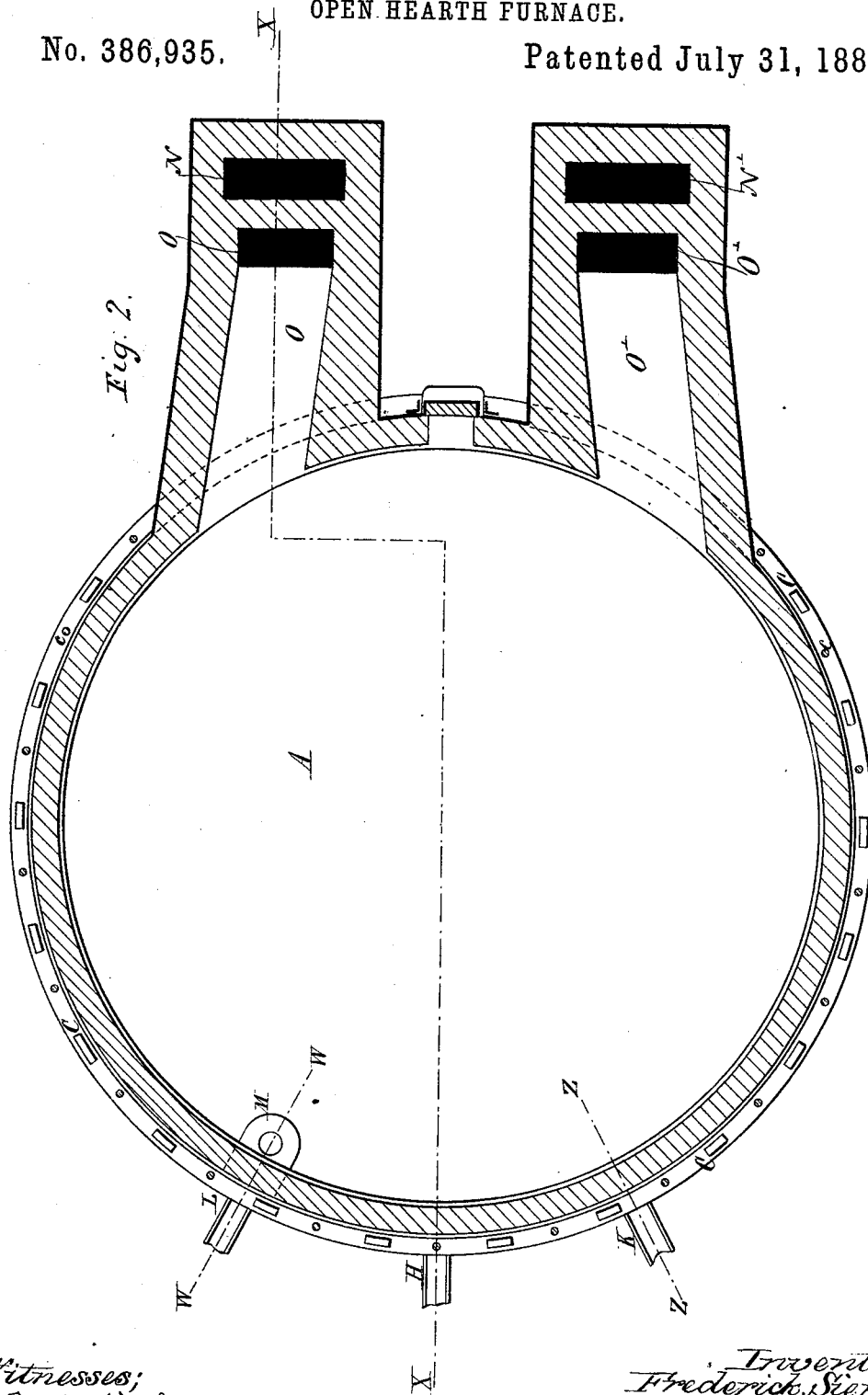
Patented July 31, 1888.



F. SIEMENS.  
OPEN HEARTH FURNACE.

No. 386,935.

Patented July 31, 1888.



Witnesses;  
L. Chad. Keller.  
Vernon M. Dorsey.

Inventor:  
Frederick Siemens  
By: C. S. Whitman,  
Attorney,

# UNITED STATES PATENT OFFICE.

FREDERICK SIEMENS, OF DRESDEN, SAXONY, GERMANY.

## OPEN-HEARTH FURNACE.

SPECIFICATION forming part of Letters Patent No. 386,935, dated July 31, 1888.

Application filed September 23, 1886. Serial No. 214,764. (No model.) Patented in England June 1, 1885, No. 6,633.

*To all whom it may concern:*

Be it known that I, FREDERICK SIEMENS, a citizen of Saxony, residing at Dresden, in the Empire of Germany, have invented an Improved Construction of Open-Hearth or Tank Furnaces, (for which I have obtained Letters Patent in Great Britain, dated June 1, 1885, No. 6,633,) of which the following is a specification.

In an application, No. 146,643, which I have filed for Letters Patent for a new method of operating open-hearth or tank iron and steel furnaces, I have described a form of furnace suitable for operating in the improved manner. My present invention relates to the construction of such furnaces, as I will describe, referring to the accompanying drawings.

Figure 1 is a section on the line X X of Fig. 2, which is a plan taken on the line Y Y of Fig. 1. A transverse central section is shown at Fig. 3. Figs. 4 and 5 are part transverse sections to an enlarged scale at W W and Z Z of Fig. 2, respectively; and Fig. 6 is a part external elevation of the bed and roof supports, which are shown in a somewhat modified form in the part elevation, Fig. 7, and part section, Fig. 8.

The furnace-bed A, which I make considerably deeper than usual, is inclosed in a metal casing, B, at the periphery of which at intervals apart a number of struts, C, and columns c or brackets C', Figs. 7 and 8, extend upward to carry a ring, D, on which is built the furnace-roof E. As the roof rests on the ring D, it is supported independently of the brick-work and lining of the bed A, which can therefore be repaired and renewed without interfering with the stability of the superstructure. The bed A is made deep in order to retain in it a great quantity of molten metal on which the fused slag floats. As the slag acts on the zone of bricks F, forming the upper layer of the bed, I make these bricks removable, having free access to them from without through the spaces between the struts C or brackets C'. The bricks F are inserted between the wall of the bed and the ring D, and may be kept in position as shown in Fig. 8 by keys G, driven between them and the brackets C'. A tap-hole, H, is provided at the bottom of the bed; but another tap-hole, K, is ordinarily employed to run off a charge, which is a small

quantity as compared with the total contents of the bed. By the tap-hole K only the upper portion of the metal and slag can be run off. When it is desired to run off metal with little or no slag, I form the tap-hole as shown at L, opening from a basin separated from the rest of the bed by a partition, M. On opening the tap-hole L metal overflowing the partition M can be run out until the floating slag is reached, when the tap-hole can be closed and the slag run out by the tap-hole K; or K may be higher than the partition M, and the slag may be tapped out by it before the withdrawal of a charge, or from time to time independently of the withdrawal of any portion of the metal.

N and O are the flues for air and gas coming from the one set of regenerator-chambers and forming a flame, which sweeps round the furnace-chamber, the products of combustion passing by the flues N' and O' to the other set of regenerators, and conversely.

Although I have in the drawings shown a furnace-chamber of circular form, it might obviously be made of elliptical, semicircular, or horseshoe form, in which the flame can sweep round, as described; or it might be of rectangular, oval, or other form, with the flame entering by flues at one end or side to pass right across the furnace, the products of combustion passing away by flues at the opposite end or side. In all cases it is of advantage to make the bed of the furnace, as shown in the drawings, accessible on all sides as well as below.

Such being the construction of the furnace, it is worked in the following manner: Successive charges are melted until the bed is filled to its whole depth, or nearly so, with the molten mass of metal and slag. A charge can then be withdrawn, leaving in the bed the principal part of the molten mass, to which a fresh charge is added. When this is melted, there may be another partial withdrawal, and so on continuously, the quantity of each fresh charge being run out from the bulk, but the main bulk itself being left in the furnace. The large body of metal thus retained effectually protects the bed, except the upper renewable layer, F, and thus there is kept in the furnace a mass of metal of uniform heat, which rapidly and evenly heats and absorbs the fresh charges admitted. A furnace may be constructed and worked, as described, for production of ingot

F. SIEMENS.  
OPEN HEARTH FURNACE.

No. 386,935.

Patented July 31, 1888.

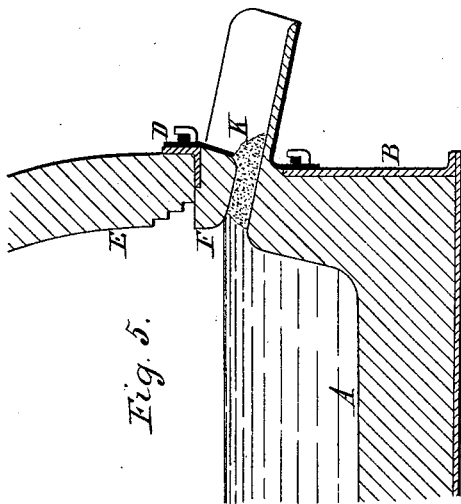


Fig. 5.

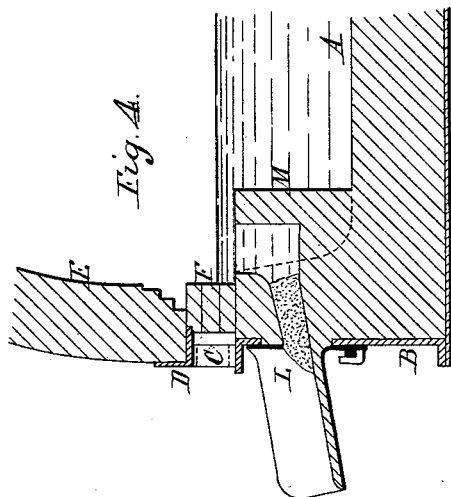


Fig. 4.

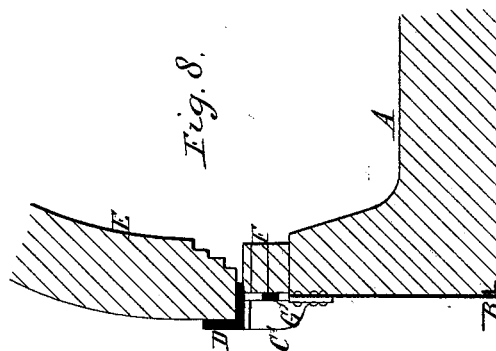


Fig. 8.

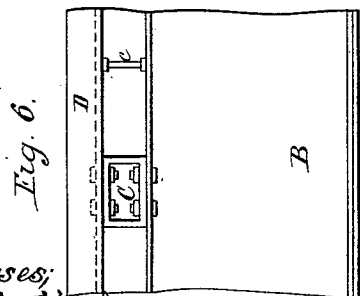


Fig. 6.

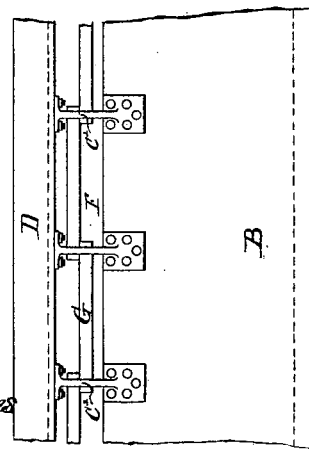


Fig. 7.

Witnesses:  
O. Fred Keller.  
Vernon M. Dowsy.

Inventor:  
Frederick Siemens  
By C. S. Whimian  
Attorney.

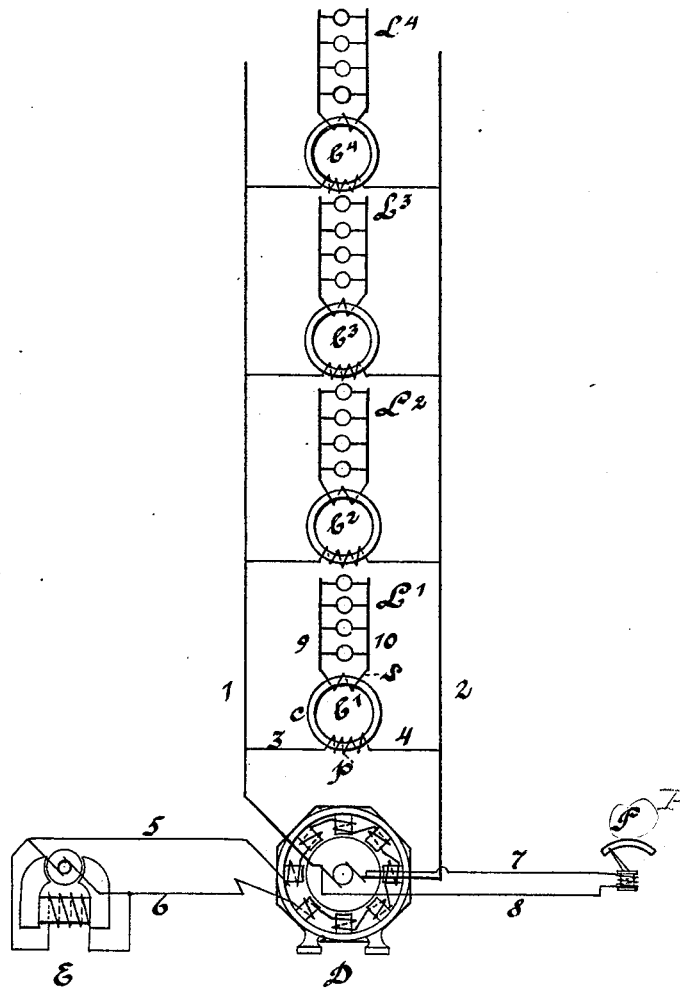
(No Model.)

M. M. M. SLATTERY.

SYSTEM OF ELECTRICAL DISTRIBUTION.

No. 386,936.

Patented July 31, 1888.



Witnesses.  
W. L. Fry,  
L. Pauter,

Inventor.  
Mauraduke M. M. Slattery.  
By R. A. Taylor  
his Attorney.

