

(No Model.)

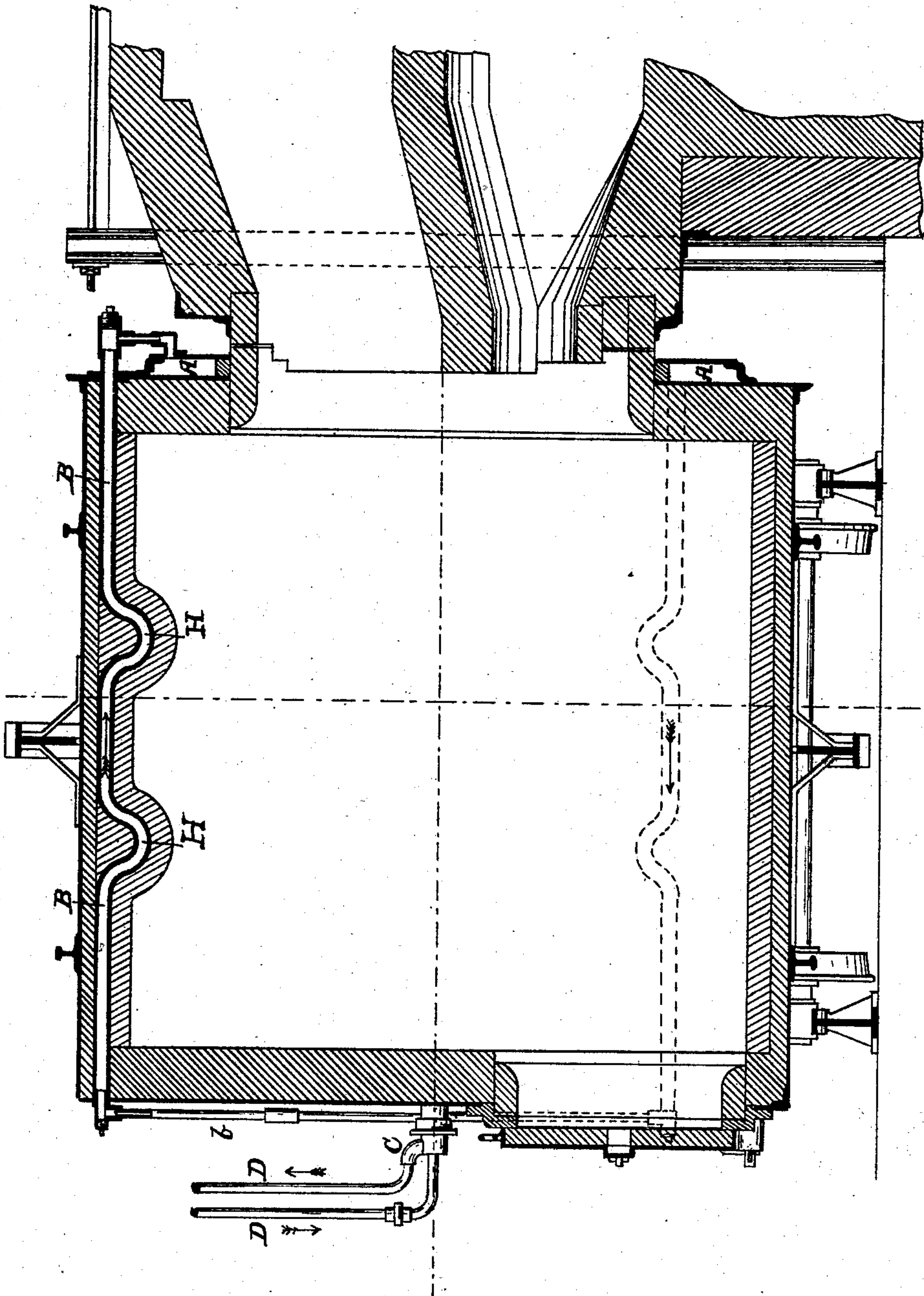
3 Sheets—Sheet 1.

C. W. SIEMENS.  
Rotative Furnace.

No. 241,515.

Patented May 17, 1881.

FIG. 1.



Witnesses:

*Samuel R. Turner*

*H. S. Martin*

Inventor

*C. W. Siemens*

by

*C. L. Plummer*

Att'y.

(No Model.)

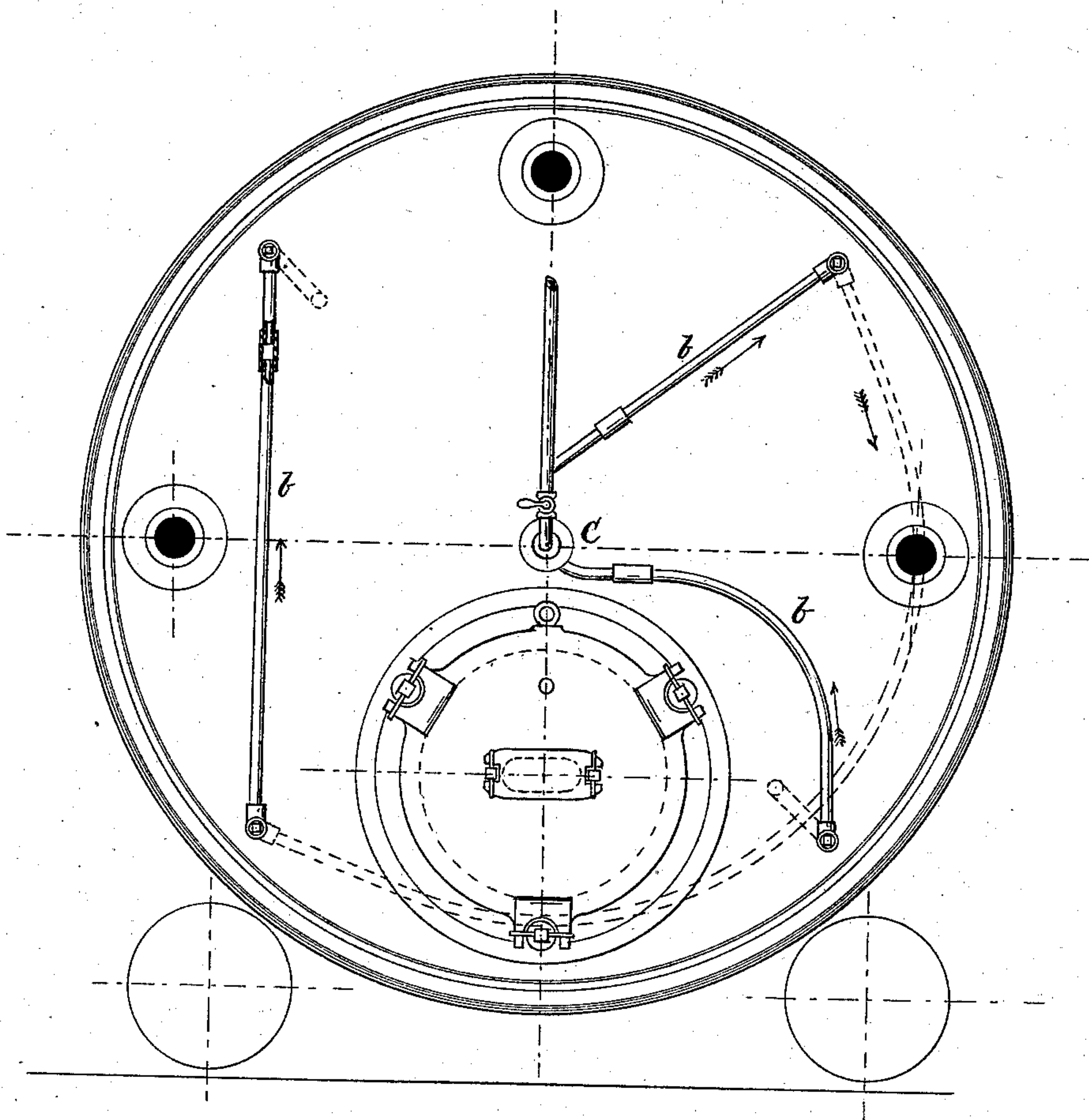
3 Sheets—Sheet 2.

C. W. SIEMENS.  
Rotative Furnace.

No. 241,515.

Patented May 17, 1881.

FIG. 2.



Witnesses:

*Sam R. Turner*

*G. S. Martin*

Inventor:

*C. W. Siemens*

by

*C. S. Whitman* Atty:



(No Model.)

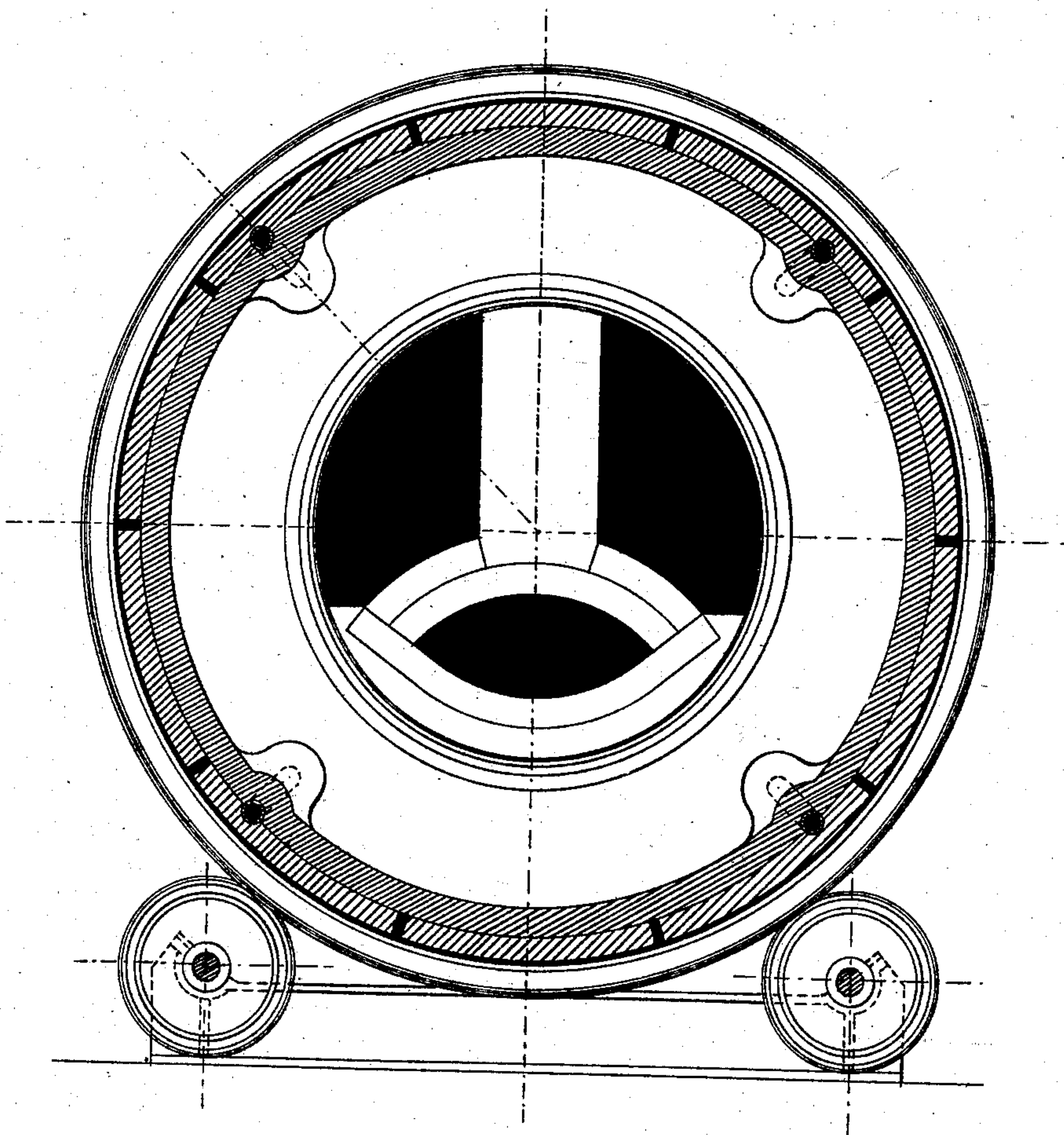
3 Sheets—Sheet 3.

C. W. SIEMENS.  
Rotative Furnace.

No. 241,515.

Patented May 17, 1881.

FIG. 3.



Witnesses:

*Samuel R. Turner*

*H. S. Martin*

Inventor

*C. W. Siemens*

by

*C. S. Whitman* Atty.



# UNITED STATES PATENT OFFICE.

CHARLES WILLIAM SIEMENS, OF WESTMINSTER, COUNTY OF MIDDLESEX,  
ENGLAND.

## ROTATIVE FURNACE.

SPECIFICATION forming part of Letters Patent No. 241,515, dated May 17, 1881.

Application filed July 17, 1880. (No model.) Patented in England December 16, 1879.

*To all whom it may concern:*

Be it known that I, CHARLES WILLIAM SIEMENS, of Westminster, in the county of Middlesex, England, have invented new and useful Improvements in Rotative Furnaces, for which I have obtained a patent in Great Britain, No. 5,150, bearing date the 16th of December, 1879, and for which I made application for a patent in France on the 16th of June, 1880.

The following is a specification of my invention:

My invention relates to means for remedying defects in existing forms of rotative furnaces; and at the same time providing protection for the throat of the furnace, which is most exposed to the destructive action of the heat, and insuring the division of the puddled mass into balls of convenient size for handling. For this purpose I provide at the back of the rotating vessel an annular or other shaped casing or casings surrounding the throat, and from such casing or casings I lead two or more pipes along and within the refractory lining of the vessel to a trunnion-joint at the center of the front of the vessel. In this trunnion-joint I provide a facing, like that of a rotating slide-valve, with ports communicating with those pipes, and also with supply and discharge pipes connected to the trunnion—the former from a water cistern, pump, or accumulator, and the latter leading to a drain or other outlet. As the vessel revolves water flows by the trunnion-ports along some of the pipes to the casing or casings at the throat of the furnace, and back thence to the discharge, a circulation of water being thus secured, keeping the pipes themselves and the furnace-throat comparatively cool. Owing to the coolness of the pipes extending along the interior of the rotating vessel, a portion of the molten material solidifies on them, incrusting them so as to form inwardly-projecting longitudinal ribs, which, as the vessel rotates, cause the pasty mass to roll and tumble over on itself, thereby facilitating and promoting the reducing and puddling action. In order to subdivide the mass into portions, so as to form balls of convenient size, I make the pipes that extend

along the interior surface of the furnace-chamber with several bends or expansions projecting inward. The material incrusting these bends or expansions forms mounds projecting from the general surface of the lining, which, as the chamber rotates, have the effect of dividing the more or less viscid mass into separate lengths, each of which, by the rolling, becomes formed into a ball. The working-door of the furnace occupies a place in its front out of the center, clear of the trunnion, and also of the branch pipes radiating from it to the longitudinal pipes. For charging the vessel it is turned to such a position that the door is above the center, and the charge may be shot into the vessel from an elevated platform. When the balling is effected the rotating vessel is stopped in such a position that the door is under the center. The door is then opened and the balls are withdrawn for treatment, according to the nature of the product required.

In the accompanying drawings, Figure 1 is a longitudinal section, Fig. 2 is an end view, and Fig. 3 a transverse section, of a rotative furnace according to this invention.

A is an annular casing surrounding the throat, which casing is connected, by means of the pipes B and branches b, with the rotating slide-valve C, and through it with the supply and discharge pipes D, so that water-circulation is maintained through the casing A and pipes B, as indicated by the arrows. In the interior of the furnace the pipes B and their bends H form projecting ridges and mounds covered with cinder or molten ore, which has set thereon owing to the presence of water in them, and these ridges and mounds cause the pasty mass under treatment to tumble over on itself and to be subdivided into portions, thereby facilitating and promoting the reducing and puddling action by causing every part of the mass to be exposed to the intense heat of the flame and the particles of metal to be agglomerated into balls of convenient size for handling.

Instead of one annular casing, A, several separate casings may be employed, each having circulating-pipes, and there might be a greater or less number of the pipes B and of their bends.

Having thus described my invention, I claim

and desire to secure by Letters Patent of the United States—

1. In a rotative furnace, internally - projecting tubes, in combination with means for supplying the same with flowing water, whereby  
5 said tubes are incrustrated with molten material or cinder, forming ridges on the lining, substantially as described.

2. In a rotative furnace having internally-  
10 projecting tubes, in combination with means for supplying the same with flowing water, the bends or knees, whereby mounds are formed

on the lining, substantially as and for the purposes described.

3. In a rotative furnace, the combination of 15 the tubes, kept filled with flowing water and provided with bends or knees, with a water-casing or water-casings at the throat, substantially as described.

C. WILLIAM SIEMENS.

Witnesses:

JNO. A. HEAD,

JAS. HAWKES,

*Both of 12 Queen Anne's Gate, Westminster, S. W.*