

(No Model.)

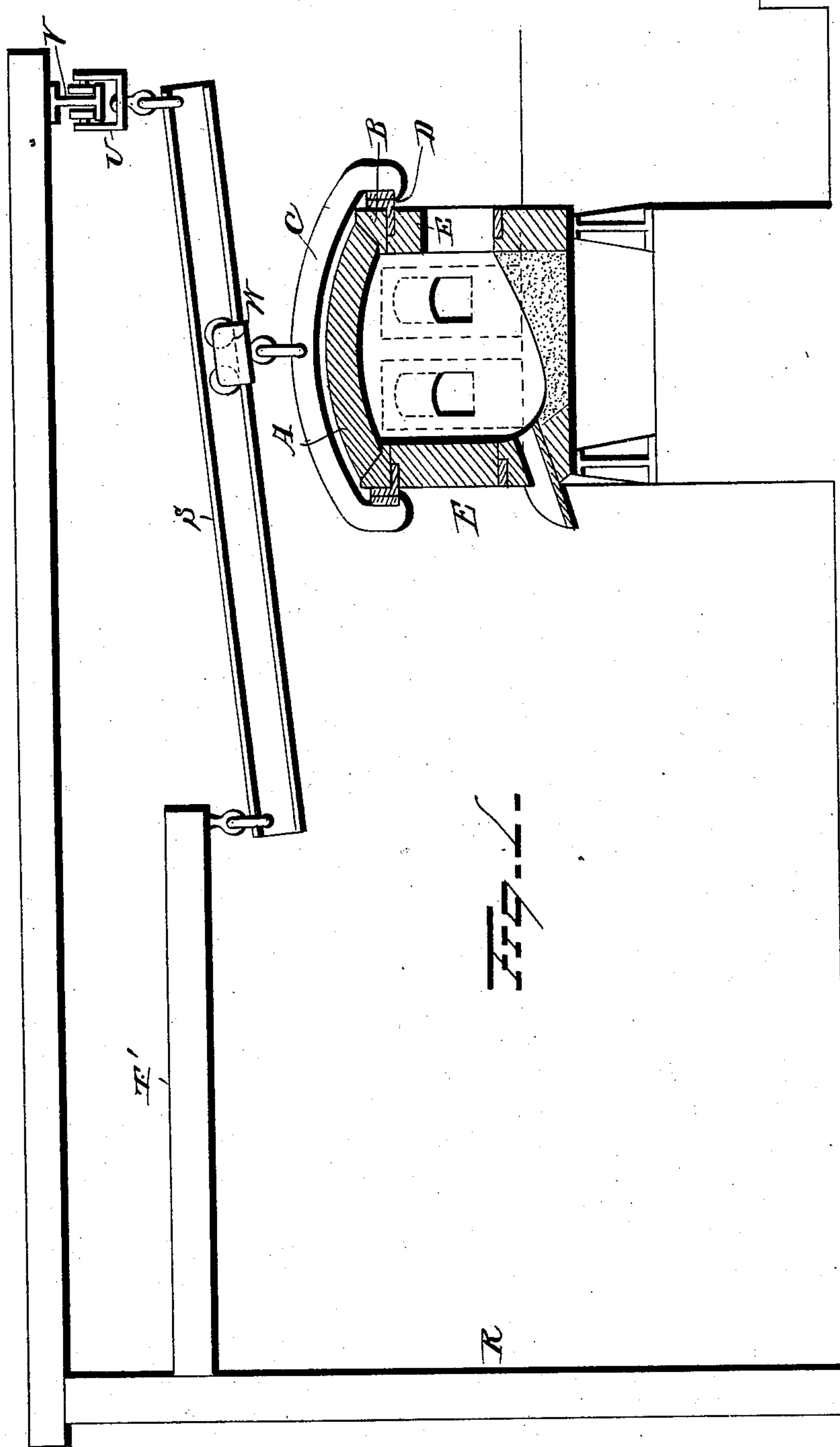
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C. M. RYDER.

OPEN HEARTH STEEL MELTING FURNACE.

No. 298,028.

Patented May 6, 1884.



WITNESSES

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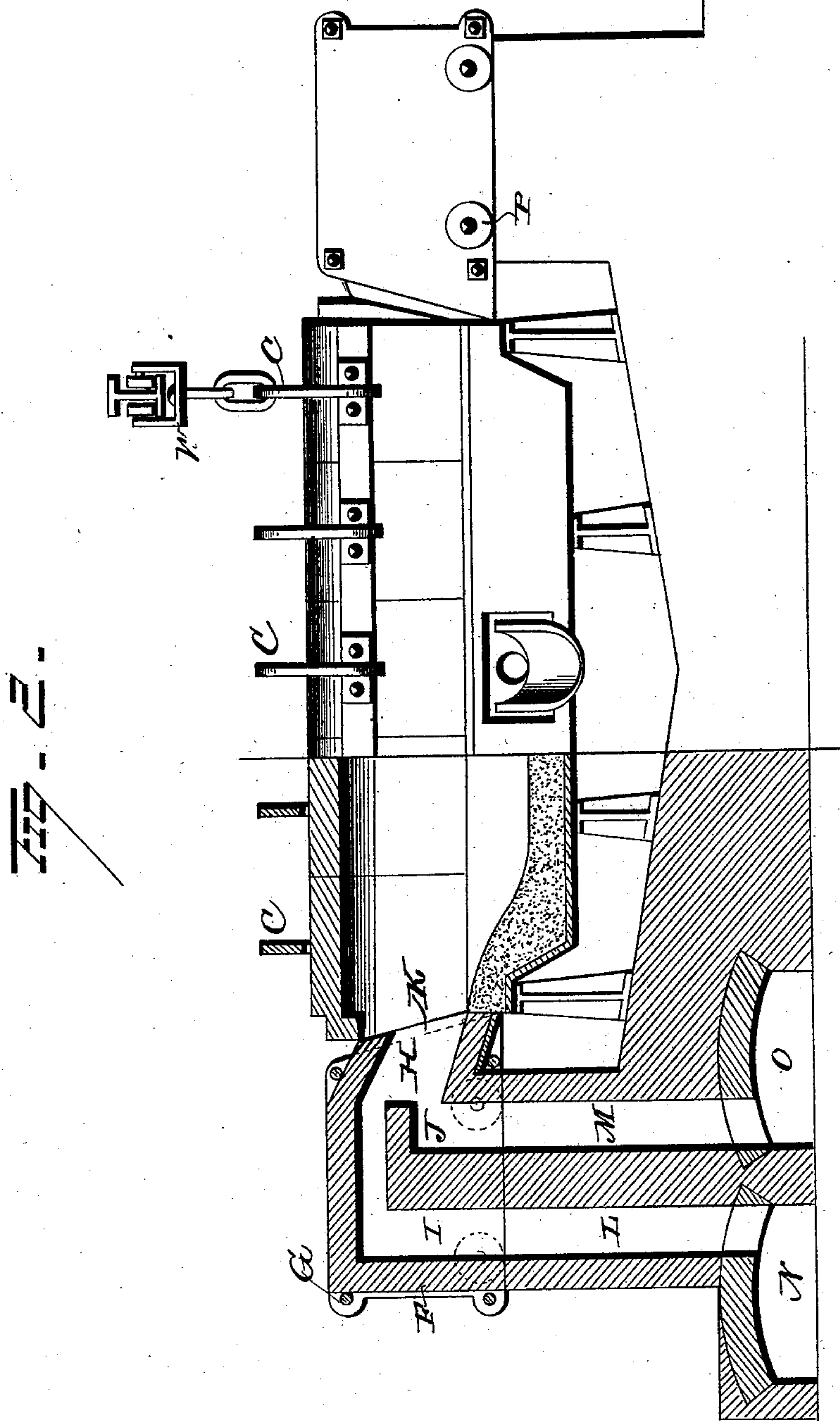
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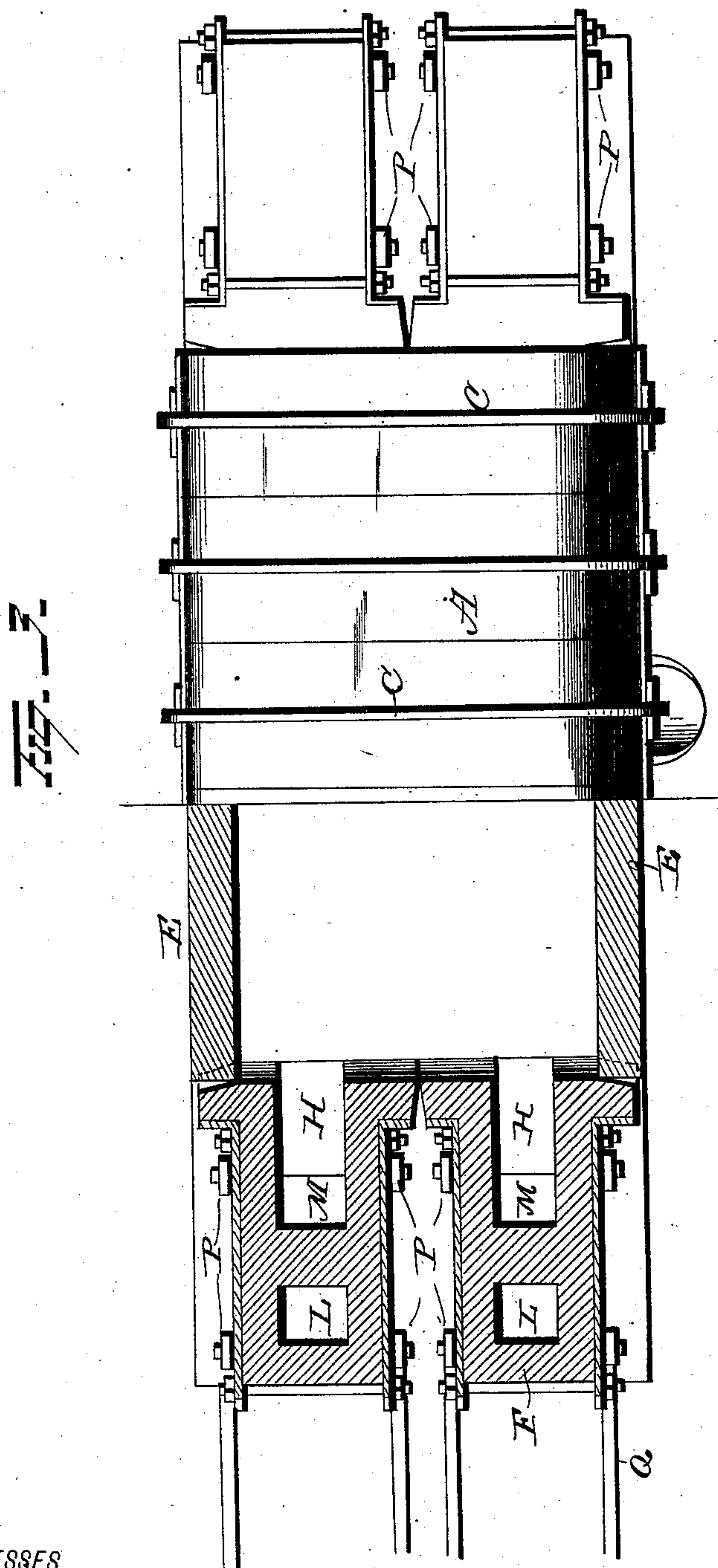
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# UNITED STATES PATENT OFFICE.

CHARLES M. RYDER, OF CHESTER, PENNSYLVANIA.

## OPEN-HEARTH STEEL-MELTING FURNACE.

SPECIFICATION forming part of Letters Patent No. 298,028, dated May 6, 1884.

Application filed May 16, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES M. RYDER, of Chester, in the county of Delaware and State of Pennsylvania, have invented certain new and useful Improvements in Open-Hearth Steel-Melting Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it ap-  
10 pertains to make and use the same.

Heretofore the repair of open-hearth steel-melting furnaces has been attended by great outlay of time, labor, and material, due to the necessity of allowing the furnaces to cool before beginning the work of restoration, to the  
15 embarrassed and slow methods of working, and to the fact that in repairing some portions of the furnaces the demolition and reconstruction of other and uninjured portions are  
20 very frequently entailed.

The object of my invention is to reduce the expense attendant upon the repair of this class of furnaces to the minimum; and it comprehends the construction of a sectional furnace,  
25 the respective sections of which shall be adapted, for the most part, to be removed and repaired or replaced without disturbing those remaining.

My invention further comprehends the construction of devices for removing and replacing the said sections, as may be desired.

In the accompanying drawings, Figure 1 is a view in transverse section of a furnace embodying my invention, showing also the devices for removing the sectional roof and the  
35 front and the rear walls of the furnace. Fig. 2 is a view of the furnace, partly in front elevation and partly in longitudinal section; and Fig. 3 is a view of the furnace, partly in plan  
40 and partly in transverse section.

The roof of the furnace consists of a number of transverse sections, A, the ends of which are supported upon blocks B. The said sections and blocks, which are made of any  
45 suitable refractory material, are mounted, as shown, in cast-steel clamps C, provided with angle-irons D.

The front and rear walls of the furnace are composed of refractory blocks or sections E,  
50 of the same width as the sections of the roof, and arranged relatively therewith as shown in the drawings.

Each end of the furnace is provided with two movable structures, F, composed of refractory material and strengthened by bolts G  
55 or equivalent means. These structures embody commingling-flues H and gas and air flues I and J. The flues H register with ports K, located in the ends of the furnace, while the flues I and J, which intersect in the flues  
60 H, respectively register with gas and air flues L and M, leading from the regenerators N and O, and terminating at the level of the charging-floor. When the furnace is not in operation, the said structures may be supported  
65 upon temporary superstructures located on the charging-floor. These superstructures are not shown in the drawings. When it is desired to dismantle the furnace for the purpose of repairing it, the structures F,  
70 mounted upon wheels P, are run out on trackways Q, laid on the charging-floor. During this displacement of the structures the gas and air blasts are prevented from escaping either by exclusion from the flues L and M, or  
75 by closing the same by suitable lids, which are not shown.

The devices herein shown for removing and replacing the sections of the furnace structure consist, essentially, of a crane, R, and a traveling beam, S. The crane, which is preferably of the hydraulic type, is provided with an arm, T, to which one end of the beam is attached, the other end thereof being suspended from a carriage, U, running on a tram-  
80 way, V, extending parallel with the front and rear walls of the furnace. A carriage, W, mounted upon and arranged to travel the length of the beam, is provided with suitable grappling devices for engaging with the sections of the roof and walls. In virtue of the capacity of the beam for vertical and lateral adjustment, as well as that of the carriage to be moved through the length of the beam, any portion of the furnace may be readily reached  
85 for removing and replacing the sections. The roof-sections may be respectively removed and replaced without in any wise disturbing those remaining. When, however, it is desired to remove the wall-sections, the roof-sections immediately above them must be removed also.  
90 It is designed to make the roof-sections interchangeable each for each, and the same of the wall-sections, so that they can be respect-



ively shifted from places of great to others of less exposure, and vice versa. In this manner the usefulness of each individual section may be greatly prolonged. It is also designed  
5 to keep the sections in duplicate, so that they can be replaced without the delay which attends repair.

The advantages derived from constructing furnaces in accordance with my invention are  
10 several fold. It enables them to be wholly or partially dismantled and reconstructed without waiting for them to cool off, and in no instance does the operation of repairing injured portions of the furnace involve the demolition  
15 and reconstruction of uninjured parts. Further, all work in the nature of repair to the furnace is greatly facilitated.

It is apparent that the several sections of the furnace need not be constructed as shown  
20 and described. The flues H may, for instance, be embodied in structures distinct from the structures F, and the devices herein shown for removing and replacing the sections may be substituted by others adapted to do the  
25 same work. I would therefore have it understood that I do not limit myself to the exact construction shown and described, but that I hold myself at liberty to make such slight changes and alterations as fairly fall within  
30 the spirit and scope of my invention.

Having fully described my invention, what I

claim as new, and desire to secure by Letters Patent, is—

1. An open-hearth steel-melting furnace having its sides composed of movable sections, 35 and its roof composed of removable and interchangeable transverse sections, the ends of the roof-sections being supported by the removable side-wall sections, substantially as set forth. 40

2. An open-hearth steel-melting furnace having its sides and roof composed of removable and interchangeable sections of equal width, substantially as set forth.

3. An open-hearth steel-melting furnace 45 having gas and air flues combined in a single structure, adapted to be moved toward and from the body of the furnace, substantially as set forth.

4. An open-hearth steel-melting furnace 50 having gas and air flues combined in a single structure mounted on wheels, and adapted to be moved toward and away from the body of the furnace, substantially as set forth.

In testimony whereof I have signed this 55 specification in the presence of two subscribing witnesses.

CHARLES M. RYDER.

Witnesses:

GEO. D. SEYMOUR,

F. O. McCLEARY.