

No. 688,393.

Patented Dec. 10, 1901.

R. C. CONTARDO.
ELECTRIC FURNACE.

(Application filed Mar. 22, 1901.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 2.

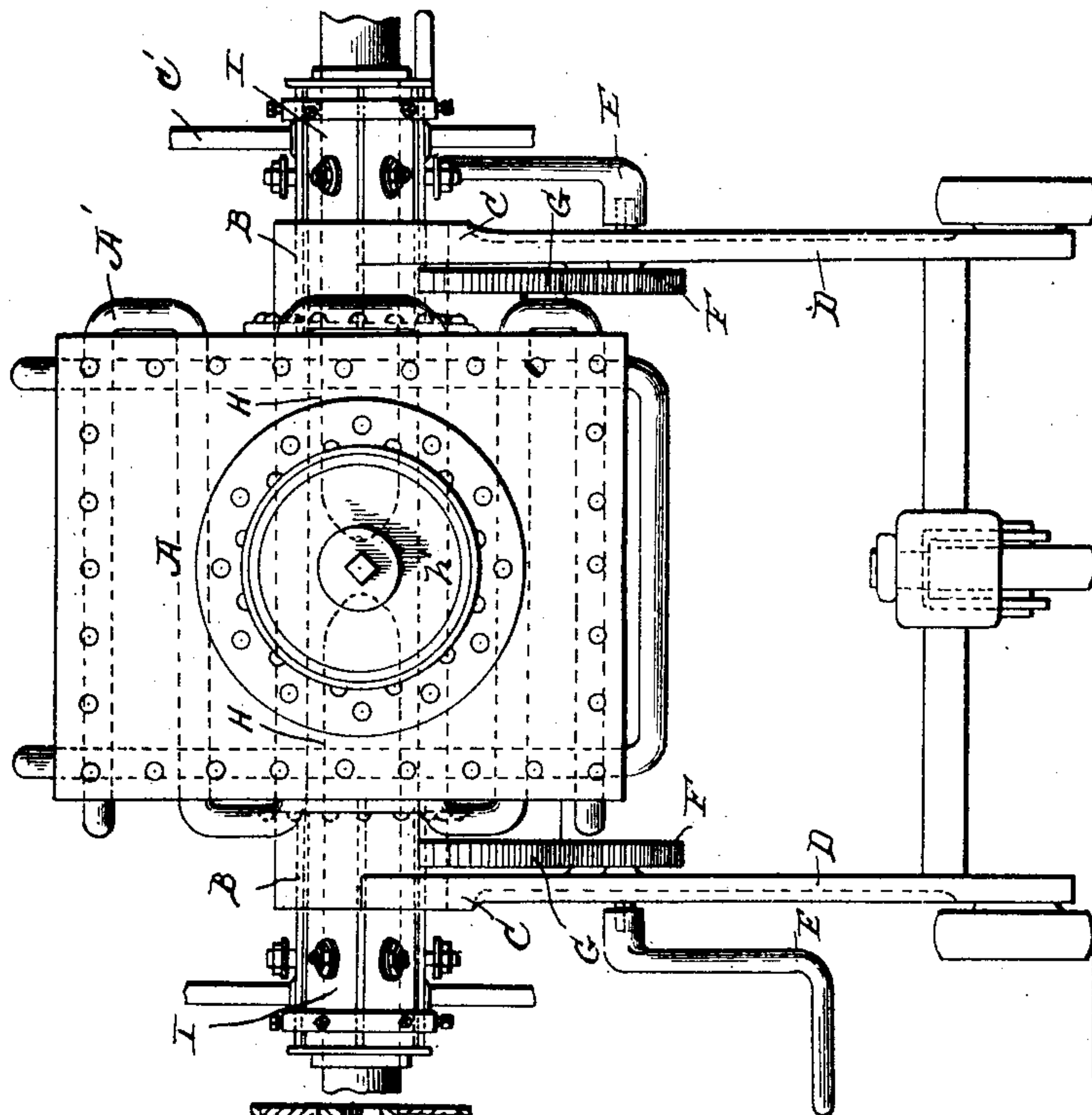
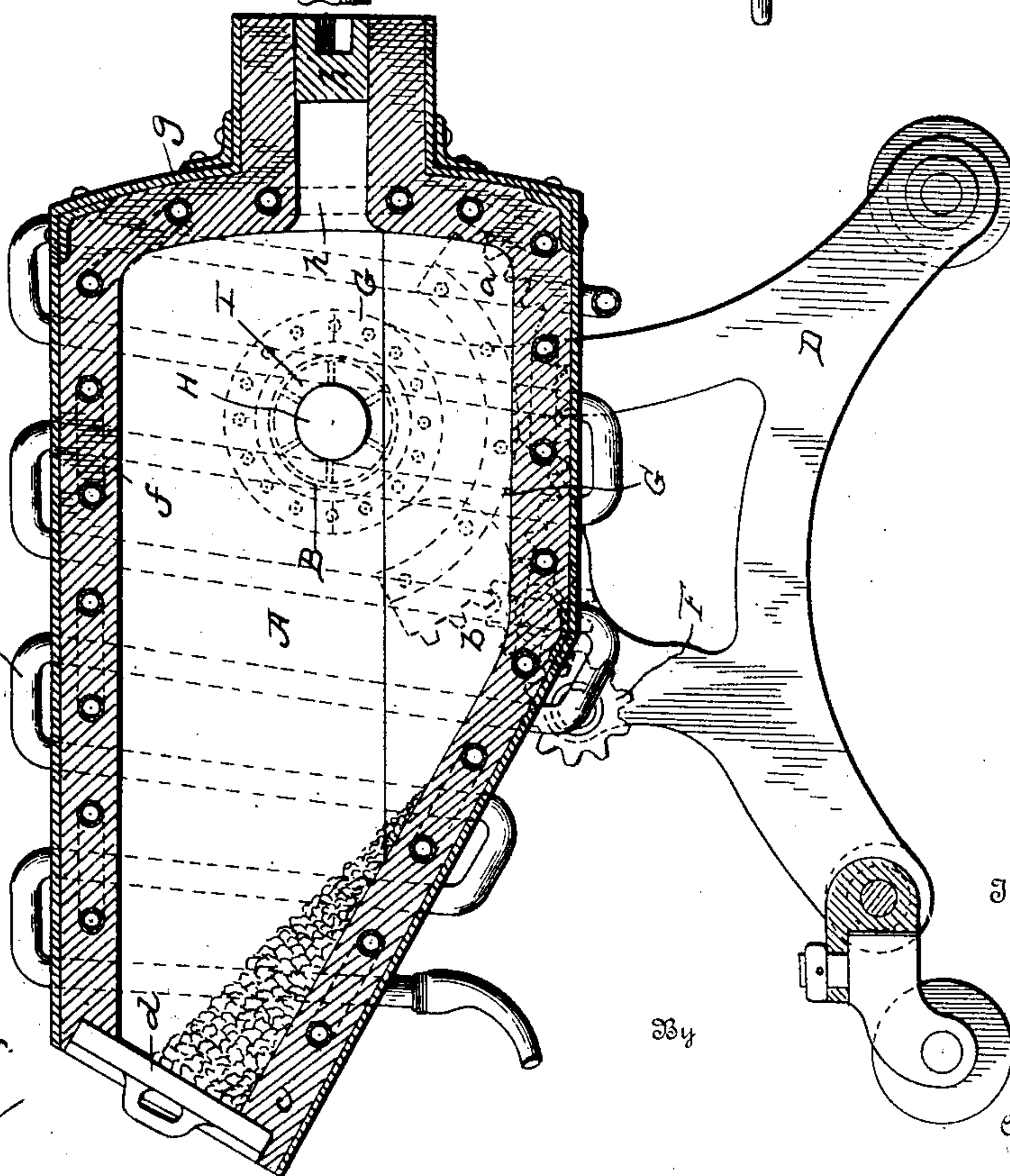


Fig. 1.



Witnesses
Am. Hillman Jr.
H. C. Jones

334

Inventor
R. Chavaria
Contardo
By *E. S. Freeman*
Attorneys

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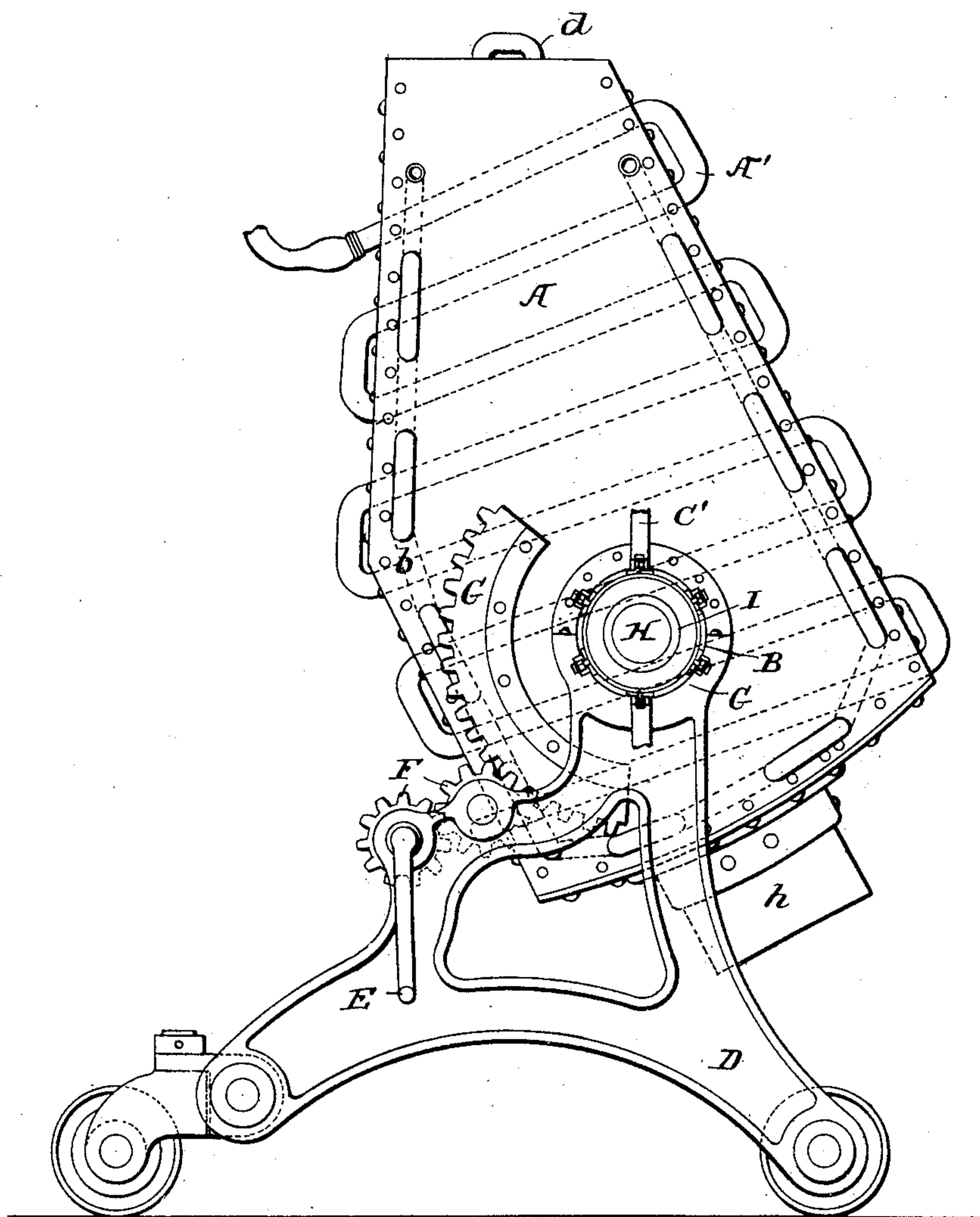
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Fig. 3.



Witnesses

J. J. Hinkel
Samuel Gellman, Jr.

Inventor

Ramon Chararia Contardo

By

Frederic W. Freeman,

Attorneys

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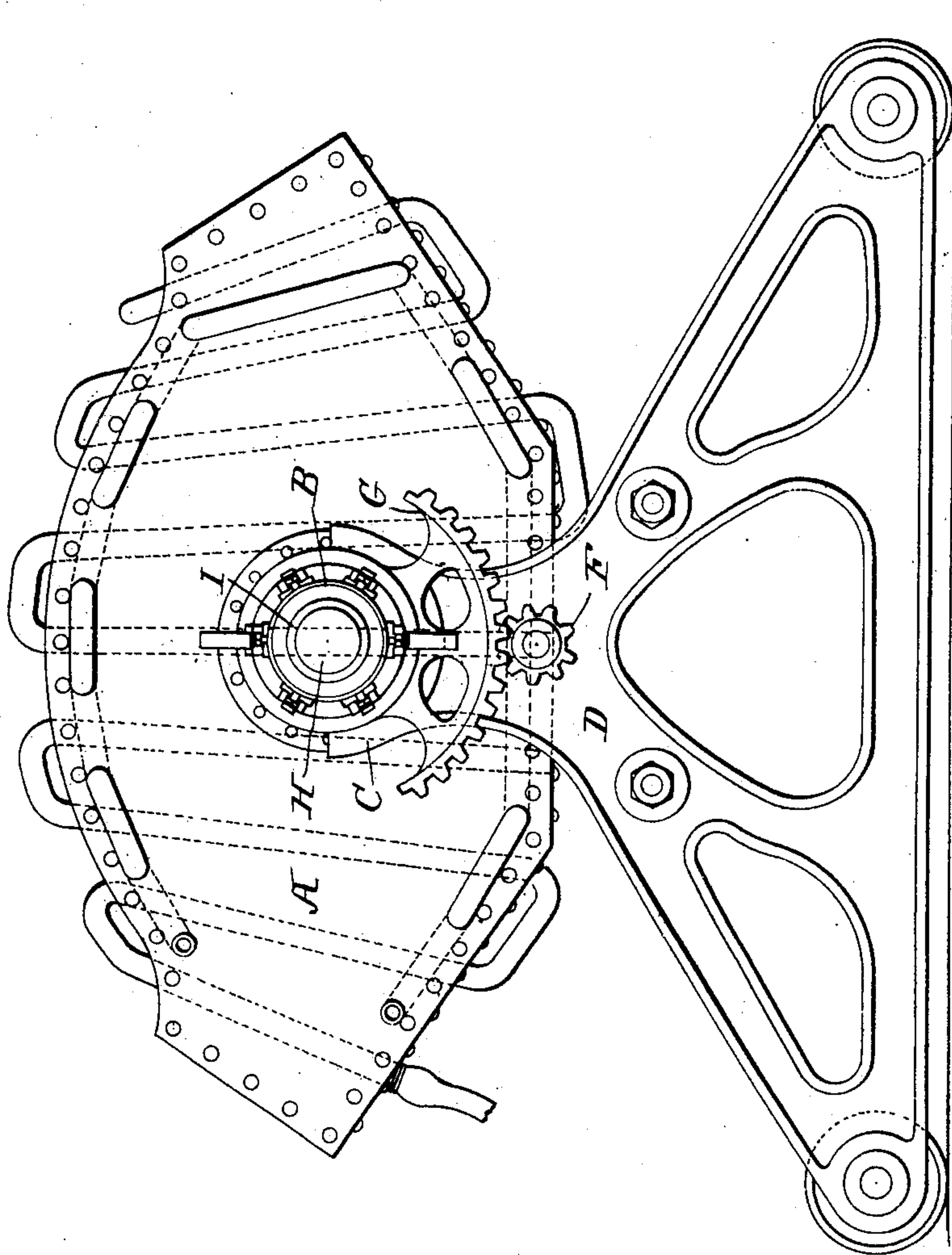
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Fig. 4.



Witnesses
J. G. Hinkel
Am. Gellman, Jr.

334

Inventor
Ramon Chavarria-Contardo
Frederick Freeman,
Attorneys

UNITED STATES PATENT OFFICE.

RAMÓN CHAVARRÍA CONTARDO, OF SEVRES, FRANCE.

ELECTRIC FURNACE.

SPECIFICATION forming part of Letters Patent No. 688,393, dated December 10, 1901.

Application filed March 22, 1901. Serial No. 52,417. (No model.)

To all whom it may concern:

Be it known that I, RAMÓN CHAVARRÍA CONTARDO, a citizen of the Republic of Chile, residing at Sevres, Seine-et-Oise, France, have
5 invented a certain new and useful Improvement in Electric Furnaces, of which the following is a specification.

My invention relates to an improvement in electric furnaces.

10 In working electric furnaces which heat by radiation from the arc or arcs difficulties are encountered, chief among them being, first, that of insuring the regular advance of the charge in thin strata in proportion as fusion
15 is effected by the arc without allowing air to gain access to the furnace and without the aid of internal mechanism that would be rapidly spoiled by the intense heat, and, secondly, the difficulties inherent to the operation of
20 emptying the molten products.

The object of my invention is to obviate these inconveniences and to provide an oscillating furnace similar in general arrangement to a Bessemer converter.

25 In the accompanying drawings, Figure 1 is a sectional side elevation of a furnace in its normal position. Fig. 2 is an end elevation. Fig. 3 is a side elevation in its discharging position, and Fig. 4 is a side elevation of a
30 modified form.

The body A of the furnace is mounted on two trunnions B B in bearings C C on any convenient frame D D, so that the axis of oscillation of A is nearly horizontal. The furnace may be turned around in its bearings by
35 any suitable means—for example, as shown in the drawings, by a crank E, pinion F, and toothed segments G, secured to the vessel A. The supports D D may be suitably secured
40 together, and the whole structure may take the form of a truck running on the ground or on rails, if desired. The axis of oscillation is placed at such a height above the ground-level that the furnace can be tipped from its normal position, Fig. 1, to the discharging position, Fig. 3, leaving enough room for placing
45 a crucible, molds, &c., under the furnace, if required.

50 The casing of the furnace carries any suitable refractory lining, which in case of need may be cooled by a circulating stream of cold water or air, as shown, circulating through a

pipe A', means being provided, if required, for enabling the oscillating movements to be performed without interfering with the water
55 circulation. The lining is covered by a sheet-iron casing, to which the trunnions B B are attached by rivets or bolts. The trunnions B B are hollow and afford a passage-way for the electrodes H H, which pass through stuffing-glands I I, cooled by means of water circulating through a pipe C' of any suitable
60 kind and having any convenient arrangement for receiving current. The electrodes and cooled stuffing-glands are supported and arranged so that all entrance of air is prevented, although the electrodes are able to be
65 advanced and withdrawn freely, and the trunnions can rotate around the electrodes. The connections with the source of current form
70 no part of this invention, and therefore are not described.

The form of the furnace-body A is such that in the normal working position, Fig. 1, that portion a b of the bed lying directly
75 underneath the arc and extending a certain distance front and rear is approximately horizontal, while the rearward extension of same, b c, forms an inclined plane or slope as far as the neck of the furnace, capable of being
80 closed by any suitable means, such as a plug or a door d, as shown in the drawings. The two side walls are preferably almost vertical, and the bed and roof f may be more or less
85 flat, as in the drawings, though the latter may also be of suitable shape to reflect the heat onto the charge on the bed a b. The front wall g is preferably somewhat concave when viewed from the inside and has on the
90 same level as the electrodes or a little higher a pouring-hole h, which can be closed with a plug h' and serves as a peep-hole.

The charge is introduced through the neck and may be distributed over the whole of the bed and as far as under the arc by tilting the
95 rear of the furnace when necessary to the requisite angle necessitated by the size and shape of the grains composing the charge. If, as very often happens, the charge becomes pasty before fusing, and thus prevents the descent
100 of the portions more remote from the arc, the furnace is tipped until they descend, whereupon it is returned to its former position. The work of charging and proceeding in the

same manner is continued until the molten mass reaches nearly up to the electrodes; but the risk of contact with these must be strictly precluded, as the heating effect must be by radiation only. The furnace is then tipped, Fig. 3, and pouring is effected. While the fusion is being carried on, the front wall *g*, the closed top *f*, and the tap-hole *h*, which are near and exposed to the arc, are raised to a temperature often exceeding that of the molten material. This latter on the furnace being tipped runs over these superheated surfaces and on arriving at the tap-hole, which is also superheated, pours out without undergoing any recooling, and the furnace empties without difficulty. When pouring is finished, the furnace is returned to its original position, and the same series of operations may be recommenced.

In certain cases it may be of advantage to be able to charge the furnace from both ends. The horizontal portion *a b* of the bed, Fig. 4, is then provided with sloping extensions *b c* and *a c'* at either end—that is to say, the two halves of the furnace are symmetrical and similar on each side of the axis of oscillation to the left half of the furnace. (Shown in Fig. 1.) In such event the charging-orifices may also serve as tap-holes.

What I claim is—

1. In an electric furnace, and in combination a heating-chamber, trunnions carried by same, stuffing-glands in such trunnions, a supporting-frame for the trunnions, horizontally-fixed longitudinally-adjustable electrodes passing through the glands into the chamber and means for oscillating the chamber on its trunnions.

2. In an electric furnace, and in combination, a heating-chamber, a bed for the charge, electrodes above such bed, said chamber having an inclined portion connecting with such

bed at one end, and with a charging-opening at the other, means for closing such opening, and means for oscillating the chamber.

3. In an electric furnace and in combination, a heating-chamber, means for oscillating the same, a bed for the charge, two substantially vertical side walls to said furnace, an end wall having a tap-hole therein, means for closing such hole, a closed roof above such bed, and electrodes passing through the side walls and projecting above such bed and below the roof and in proximity to the tap-hole, whereby while the charge on the bed is being heated by radiation alone the roof, end, and tap-hole are also raised to a high temperature so that upon tilting the furnace the charge will flow over the highly-heated end and roof to prevent cooling of the charge, substantially as described.

4. In an electric furnace, and in combination, a heating-chamber, trunnions carried by same, stuffing-glands in such trunnions, a supporting-frame for the trunnions, electrodes passing through the glands into the chamber, a bed for the charge, substantially horizontally arranged, and above which the electrodes are situated, said chamber having an inclined portion connecting with the bed at one end and with a charging-opening at the other, means for closing such opening, a tap-hole at the opposite end of the bed, means for closing same, a segment carried by the chamber and a pinion engaging with same for oscillating it.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

RAMÓN CHAVARRÍA CONTARDO.

Witnesses:

GORDON D. STEWARD,
MICHEL T. CHIERRY.