

(No Model.)

3 Sheets—Sheet 1.

J. HENDERSON.

FURNACE FOR MANUFACTURING IRON AND STEEL.

No. 312,632.

Patented Feb. 24, 1885.

Fig. 1

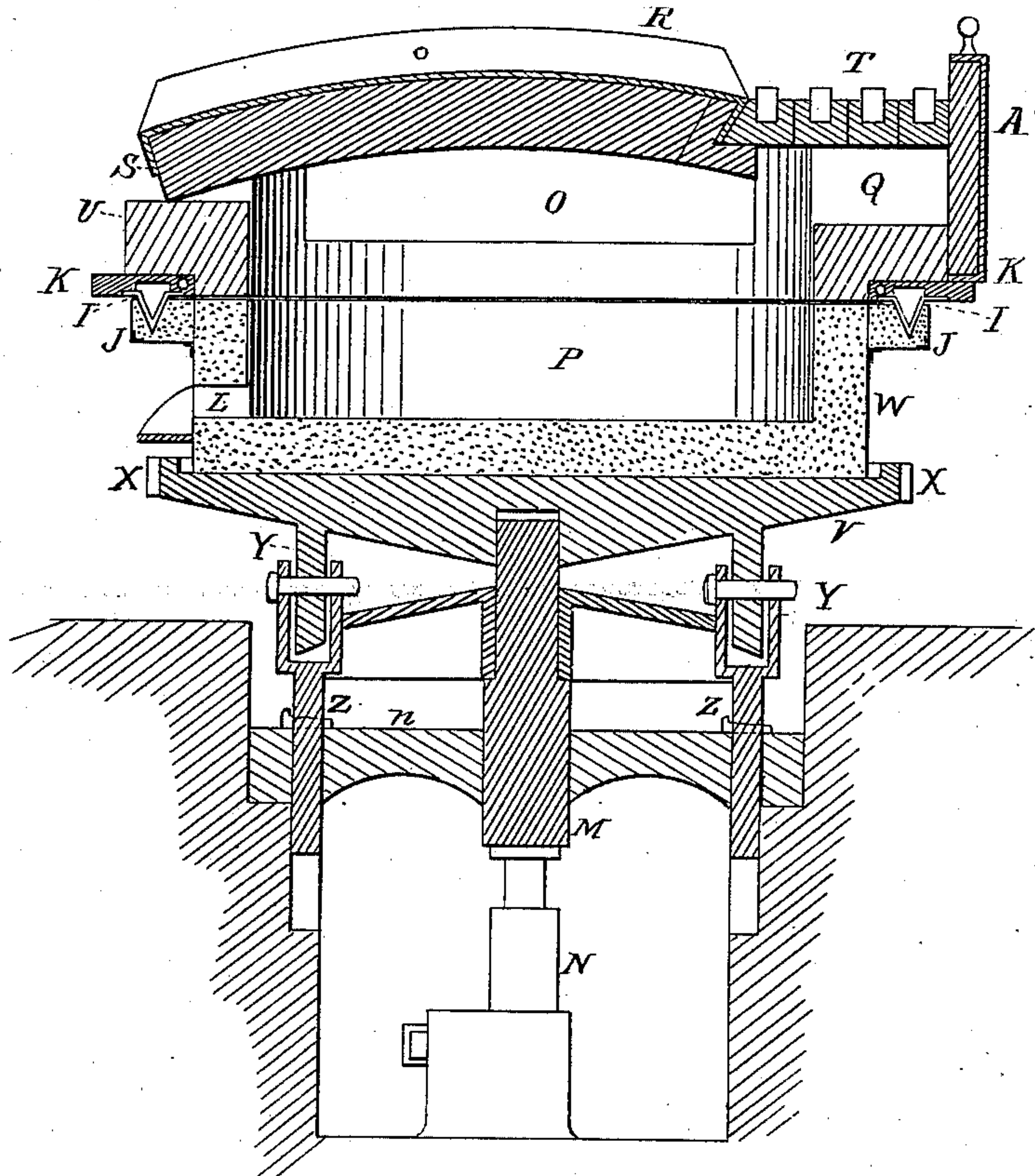
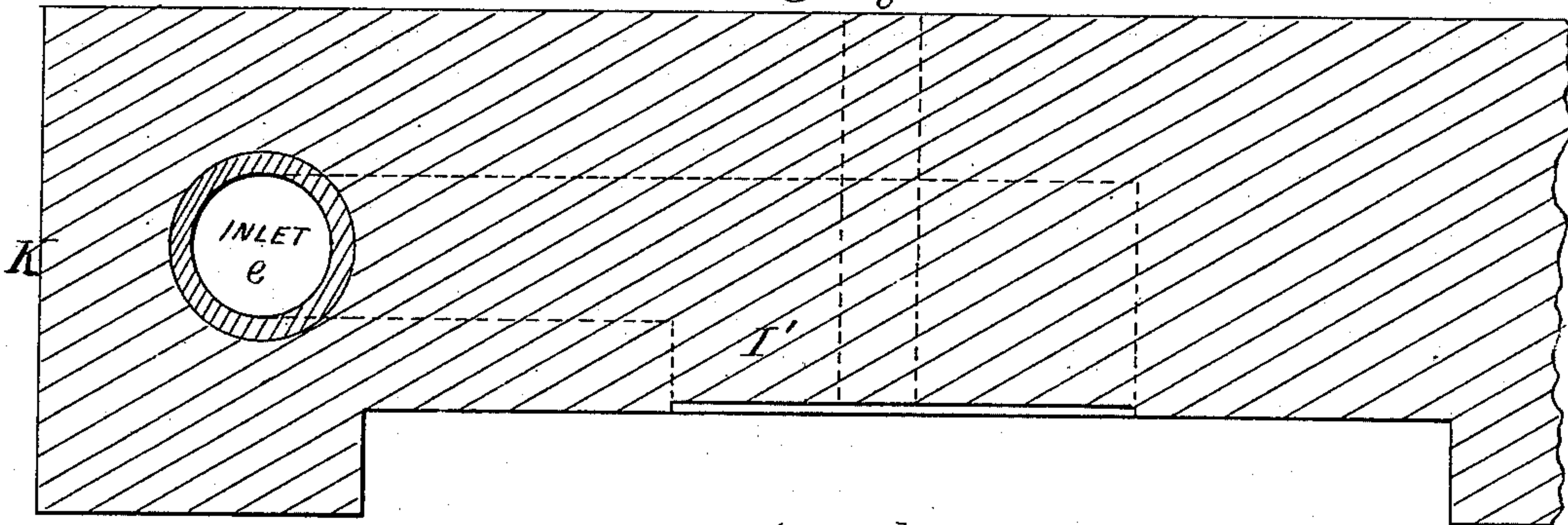


Fig. 5



Section through G-H

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FURNACE FOR MANUFACTURING IRON AND STEEL.

Fig. 2 Patented Feb. 24, 1885.

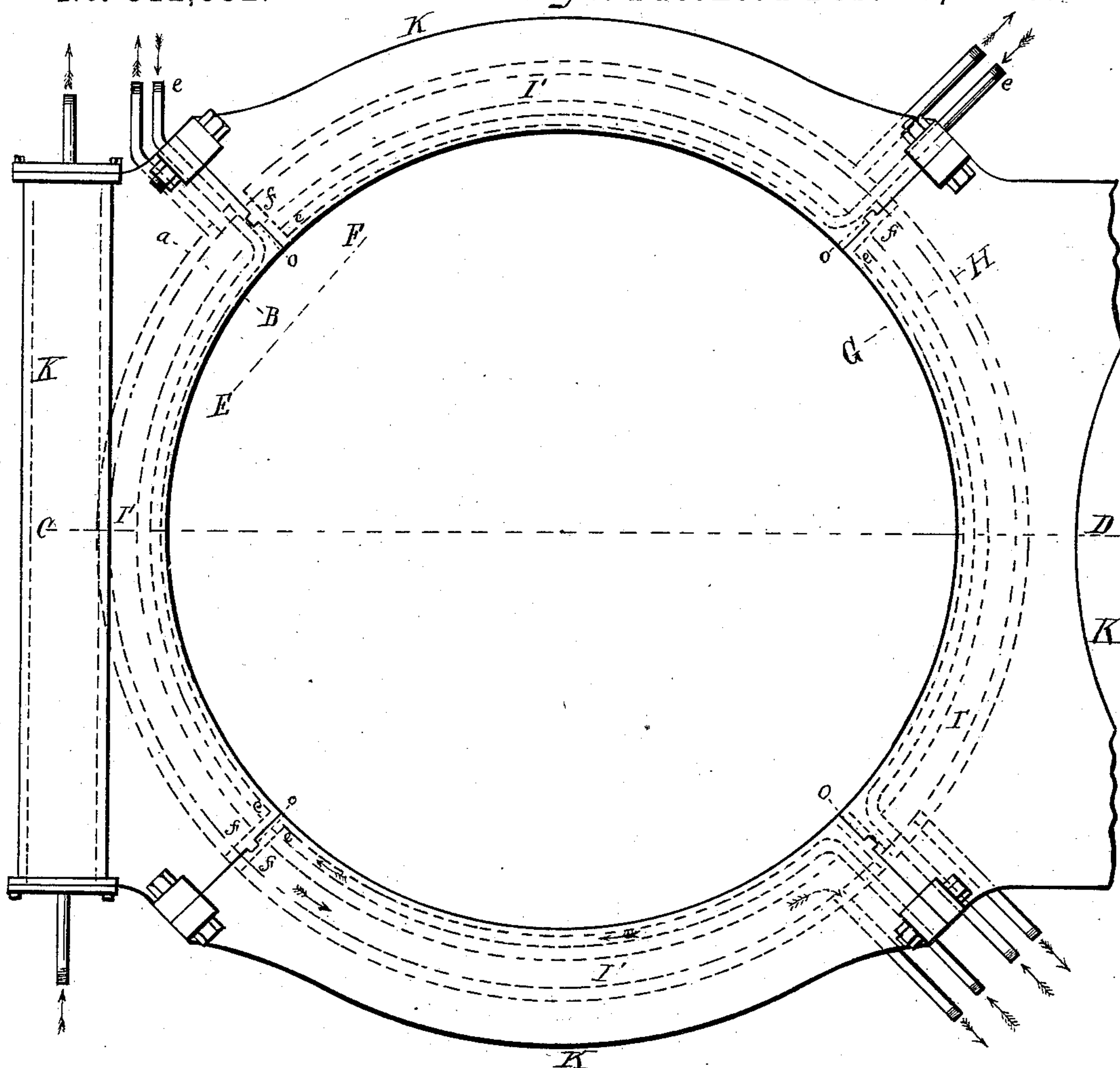
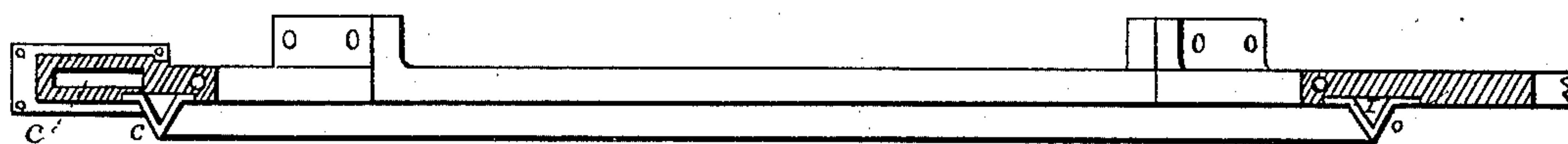


Fig. 4



Section through C.D.

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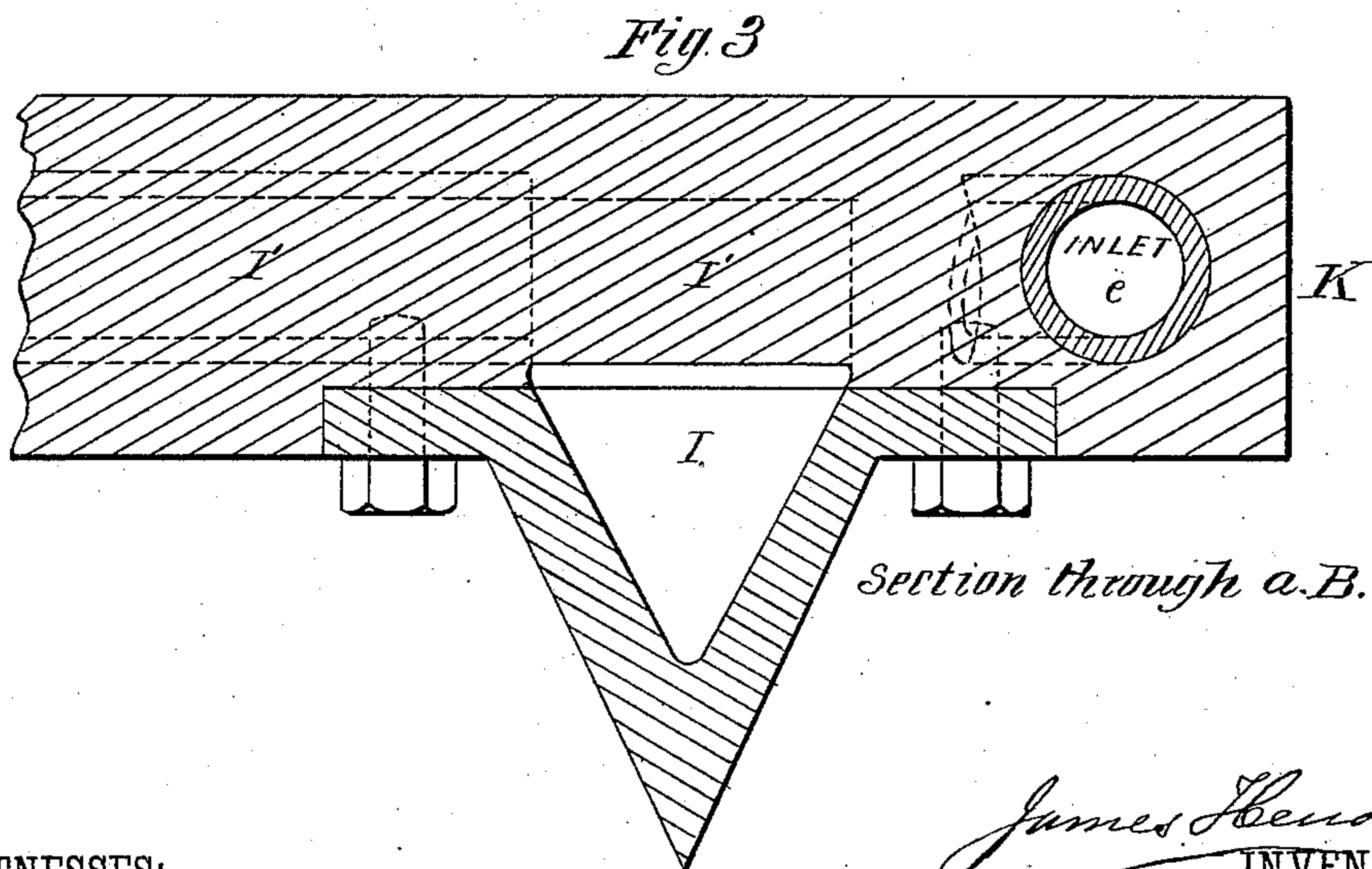
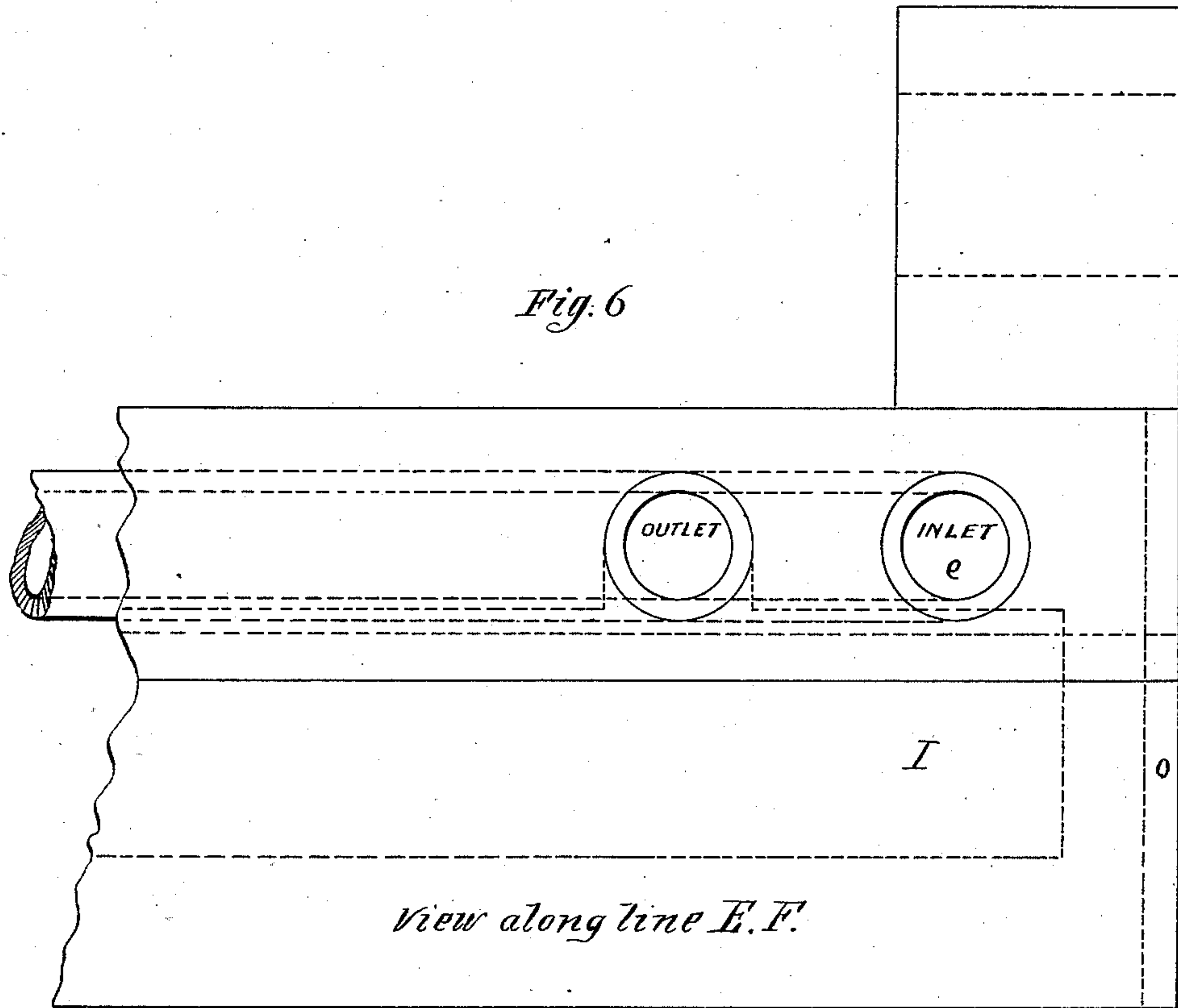
3 Sheets—Sheet 3.

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FURNACE FOR MANUFACTURING IRON AND STEEL.

No. 312,632.

Patented Feb. 24, 1885.



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UNITED STATES PATENT OFFICE.

JAMES HENDERSON, OF BELLEFONTE, PENNSYLVANIA.

FURNACE FOR MANUFACTURING IRON AND STEEL.

SPECIFICATION forming part of Letters Patent No. 312,632, dated February 24, 1885.

Application filed January 10, 1885. (No model.)

To all whom it may concern:

Be it known that I, JAMES HENDERSON, of Bellefonte, county of Centre, and State of Pennsylvania, have made an invention in certain new and useful Improvements in Furnaces for Manufacturing Iron and Steel and for other Purposes, of which the following is such a full, clear, and exact description as will enable others skilled in the art to make and use the same, when taken in connection with the accompanying drawings, in which—

Figure 1 is a section of the furnace, showing the water ring-plate K in cross-section, which is the subject of this invention. Fig. 2 is a plan of the same. Fig. 3 is an enlarged section of the same through the line *a* B. Fig. 4 is a sectional view through the line C D. Fig. 5 is a sectional view through the line G H, and Fig. 6 a view along the line E.

All of the letters refer to the same parts in the different drawings.

Fig. 1 is the reverberatory chamber of a furnace, such as is described in Letters Patent No. 282,315, granted to me July 31, A. D. 1883, and here shown in vertical cross-section, in which—

O is the outlet-flue to the chimney.

U is the side wall of the upper part of the reverberatory chamber.

S is the roof of the chamber, resting in a cast-iron clamp, R, several of such clamps being placed sidewise to form the roof, and extending across the chamber. T is the covering of the inlet Q, closed by the door A'.

W is the hearth of the furnace, lined with a suitable refractory material, and rests on the table V, which is provided with teeth at X X on the rim, by which it is revolved by spur-wheel gearing. (Not shown.)

Y Y are beveled wheels upon which the hearth revolves.

Z Z are guide-rods passing through the plate *n*, and steady the platform on which the wheels rest, and also support it by the keys driven through slots in the rods, as shown.

M is the pintle, moved by the hydraulic ram N, to raise and lower the hearth.

L is the spout through which the contents of the hearth may be poured. The hearth is maintained in its vertical position in the furnace by the guide-rods and pintle, and is sealed, so that there cannot be any passage of heat or

gases from the furnace to the external air by the annular open box J at the top, which may be filled with the same material, in a finely-divided state, of which the lining of the hearth is composed, or water may be used.

K is the ring-plate, of cast-iron, preferably made in sections, as shown in Fig. 2, in which *e* and I' are the cooling-chambers, the latter chamber being provided with a V-shaped hollow lip, I, dipping into the box J.

Fig. 2 is a plan view of the plate K, divided into four sections, held together by bolts. Water enters the plate at the pipe *e*, cast therein near the inner surface, and passes to the farther end, where it discharges into the chamber I' at *f*, and passes back to the place near where it entered, and is discharged by another pipe, (shown by the arrow pointing outward.) The joint between the plates is closed by the tongue and groove *o*, (also shown in Figs. 5 and 6,) so that gases may not pass between the sections of the plates to the outside of the furnace.

Fig. 3 is a sectional view, on an enlarged scale, of the plate K, showing the inlet-pipe *e* and the chamber I', into which it discharges, and the V-shaped hollow lip I, connecting with the chamber I', and closing it by means of bolts, as shown. The lip is thus easily removed, and also any earthy deposits.

The plate K is shown with two channels for circulation of water; but one may be used with the entrance or inlet pipe at one end of the section and the outlet-pipe at the other end of the section, or it may be cast in one piece with the two water-channels, as shown; but it is preferred to cast it in sections, as there is less risk of the expansion of the plate from the heat of the furnace, and of its breaking in consequence of such expansion.

The vertical joint *o* (shown as a tongue and groove between the sections of the plate) insures the prevention of the gases from passing from the furnace-chamber to the outside, which will otherwise be possible from the expansion and contraction of the iron from heating and cooling under long-continued use; but I do not limit myself to this device for preventing the escape of gases between the sections of the plates, as a scarfed joint may be used; but I do not limit myself to these devices for closing the sections of the plate, as others may be used.

I do not claim as a part of this the ring-plate which supports the walls of the reverberatory chamber separately from the hearth thereof, with a ring cooling chamber connected
5 with said ring-plate and disconnected from said hearth, as this is the subject of Letters Patent granted to me, No. 281,761, dated July 24, A. D. 1883, of which the present invention is an improvement; nor do I claim the seal-
10 joint formed by the ring-plate on which the walls of the reverberatory chamber rest, in which is a cooling-chamber, and the upper edge of the hearth provided with an annular groove containing a sealing material, into
15 which a circular downwardly-projecting lip on the ring-plate dips, as this is described in Letters Patent No. 282,315, dated July 31, 1883, granted to me.

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

1. The combination, substantially as before set forth, of the ring-plate divided into sections, which supports the walls of the rever-

beratory chamber separately from the hearth thereof, with a ring cooling chamber connected
25 with said ring-plate and disconnected from said hearth.

2. The combination, substantially as before set forth, of the ring-plate, which supports the walls of the reverberatory chamber separately
30 from the hearth thereof, and a ring cooling chamber within said ring-plate, with a hollow downwardly-projecting lip attached to said ring-plate, and the upper edge of the hearth provided with an annular groove containing
35 a sealing material, in which the hollow downwardly-projecting lip on the ring-plate dips.

3. The ring-plate, with a ring cooling chamber made in sections, having the vertical joint between the sections, made substantially
40 as set forth, for preventing the passage of gases.

JAMES HENDERSON.

Witnesses:

JOSEPH J. SULLIVAN,
JOHN E. ELMENDORF.