

No. 630,108.

Patented Aug. 1, 1899.

G. A. RICHARD.
ORE ROASTING AND CALCINING FURNACE.

(Application filed Dec. 10, 1898.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

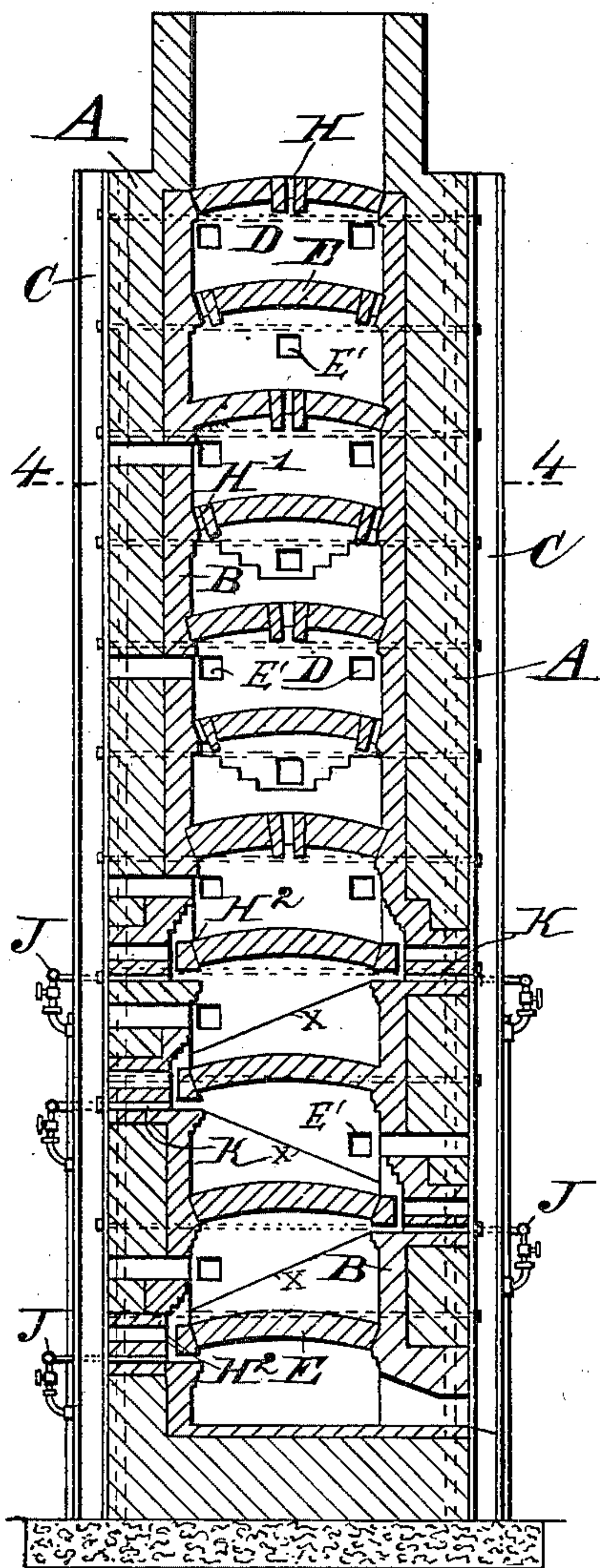


Fig. 3.

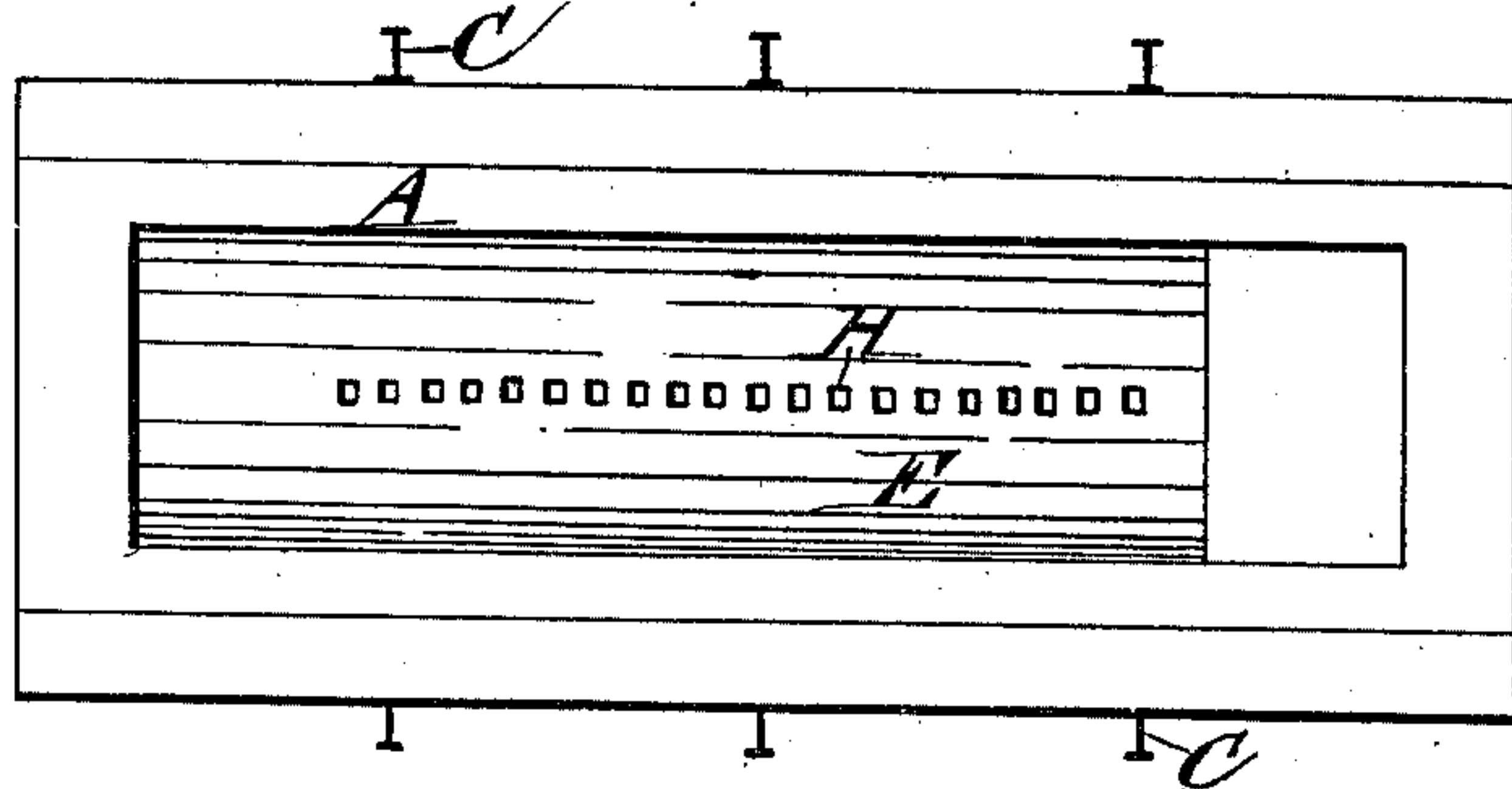
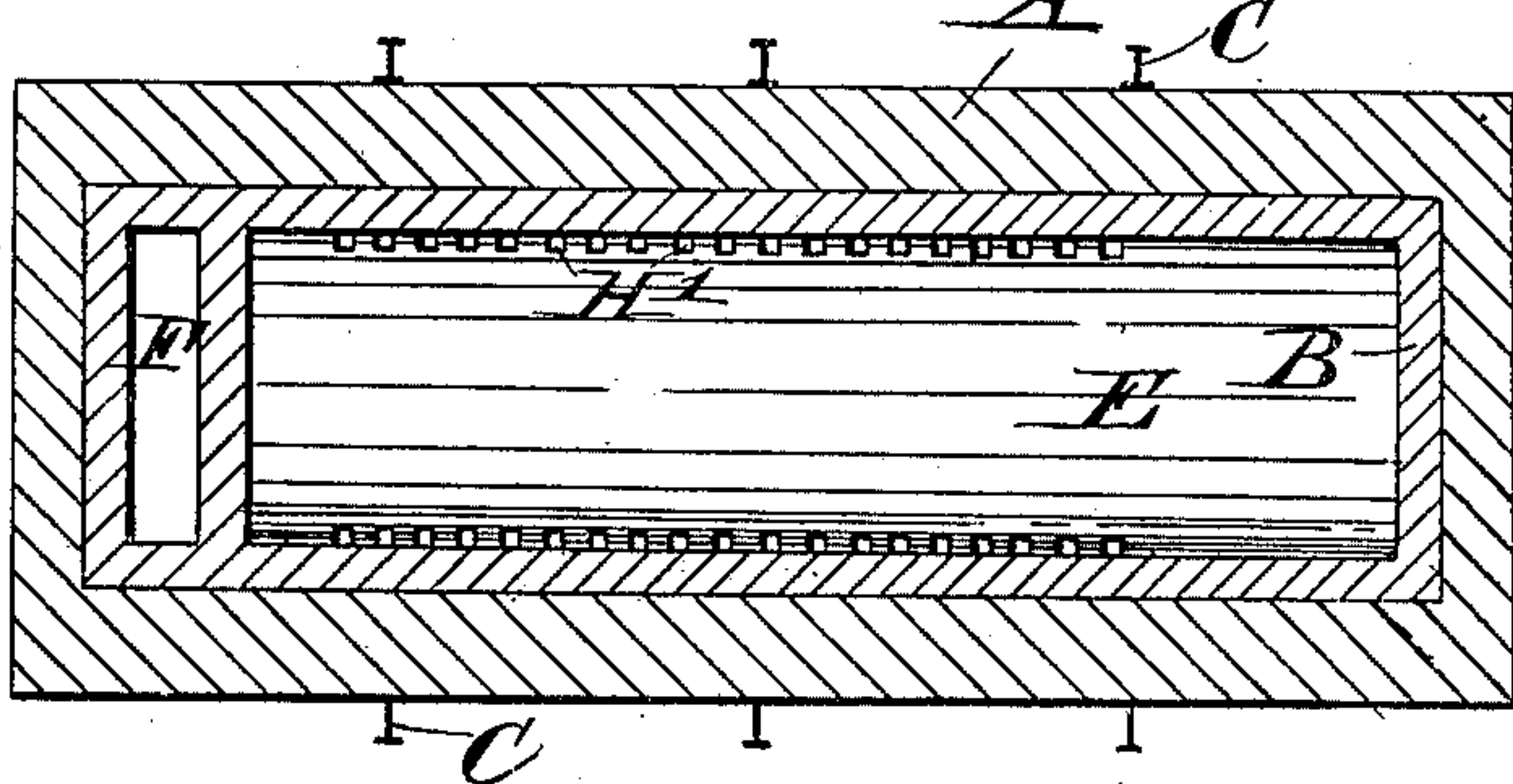


Fig. 4.



Witnesses

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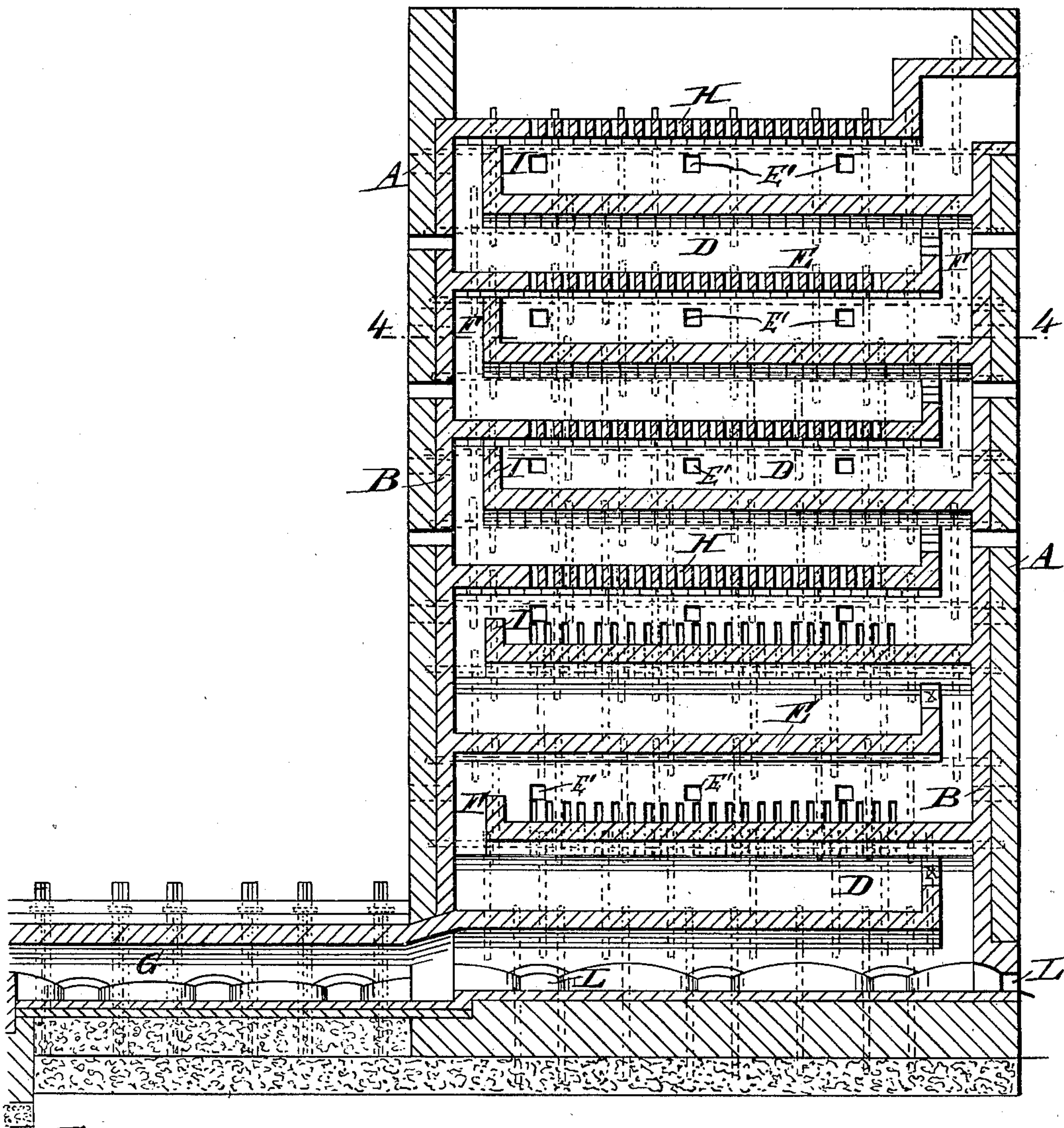
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2 Sheets—Sheet 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

GEORGE ANDERSON RICHARD, OF MOUNT MORGAN, QUEENSLAND.

ORE ROASTING AND CALCINING FURNACE.

SPECIFICATION forming part of Letters Patent No. 630,108, dated August 1, 1899.

Application filed December 10, 1898. Serial No. 698,872. (No model.)

To all whom it may concern:

Be it known that I, GEORGE ANDERSON RICHARD, engineer, a subject of the Queen of Great Britain, residing at "The Range," Mount Morgan, in the British Colony of Queensland, have invented an Improved Ore Roasting or Calcining Furnace, (for which I have applied for patents in the British Colonies of Victoria, dated December 15, 1897, No. 14,836; in South Australia, dated December 16, 1897, No. 5,212; in New South Wales, dated December 17, 1897, No. 8,060; in Tasmania, dated December 17, 1897, No. 2,076; in Queensland, dated December 18, 1897, No. 4,239; in New Zealand, dated December 23, 1897, No. 10,245, and in Western Australia, dated December 24, 1897, No. 1,910,) of which the following is a specification.

This invention relates to ore roasting or calcining furnaces, especially to those classes which belong to what are known as the "shaft" type. Its object is to provide an improved ore roasting or calcining furnace of this type which will be specially applicable for the treatment of ores intended to be subsequently subjected to chlorination or other hydrometallurgical treatment.

In order that the invention may be clearly understood, I will describe it with the aid of the accompanying drawings, in which—

Figure 1 is a vertical transverse section of my improved ore roasting or calcining furnace. Fig. 2 is a longitudinal vertical section thereof. Fig. 3 is a plan thereof, while Fig. 4 is a horizontal section on lines 4 4, Figs. 1 and 2.

The same letters of reference indicate the same parts in all the figures.

My improved ore roasting or calcining furnace consists, mainly, of a comparatively tall oblong structure A, of brickwork or other suitable material, lined with fire-brick B, tied together and strengthened by upright rails C. This oblong structure A is divided horizontally into a number of compartments D D by means of brick arches E, springing from the side walls of the structure and bridging across it. Openings F are left through or at the alternate ends of these horizontal partitions or arches E, so that the products of combustion from the furnace G at or connected with the lower part of the structure may be caused to

travel up a zigzag path before escaping from the upper end of the structure.

Any desired number of partitions or arches E may be used; but in practice I think that eleven or twelve will be sufficient. Most of the partitions or arches, especially those in the upper portion of the structure, are formed with openings H along the center and H' along each side alternately, so that the crushed ore fed onto the uppermost partition or arch in any convenient manner will pass through the openings H in the center thereof and will then be divided and will flow through the openings H' in the side of the next arch, and so on through the series. The partitions or arches E in the lower part of the structure may be constructed with openings H² along one side only, said openings being arranged to alternate with each other, or, if so preferred, either the upper or the lower series of partitions or arches may be dispensed with. In either case the material to be acted upon will be caused to travel downward in a zigzag path extending from side to side of the structure, while the products of combustion will be caused to travel upward, likewise in a zigzag path, but extending from end to end of the structure instead of from side to side.

To prevent the crushed ore from falling off the ends of the partitions or arches and so through the openings F, provided for the products of combustion, the said ends of said partitions or arches are constructed each with a small upwardly-projecting retaining-wall I, as shown. In Fig. 2 the walls X are shown as decreasing in height from the top toward the bottom of the stack to facilitate the passage of the crushed ore and to prevent clogging. The openings E' at the sides of the structure extend into the chambers D, as seen in Figs. 1 and 2. The lowermost compartments are provided with alternately oppositely disposed sloping walls X, as seen by the inclined lines in Fig. 1 and also in Fig. 2. The openings H² in the sides of the lower series of partitions or arches are arranged in recesses in the brickwork of the side walls of the structure.

In order to regulate the passage of the ore, small twyers or injectors J (see Fig. 1) may be directed through openings K in the walls of the furnace, so that a jet of air, steam, or

gas may be forced through them either intermittently or continuously, as may be found desirable, for the purpose of insuring the feed of the material.

5 The lowest compartment of the furnace is provided with rabbling doors L, and it may be continued to any desired length outside the structure containing the partitions.

10 Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

15 1. The herein-described ore roasting and calcining device, comprising a vertically-elongated structure, a furnace at the bottom thereof and horizontal partitions therein provided with openings at alternately opposite ends, some of said partitions being provided with
20 openings at the sides, and some of said partitions being provided with vertical openings therethrough along the longitudinal center

thereof, substantially as and for the purpose specified.

2. The herein-described ore roasting or calcining device comprising the furnace, a ver- 25 tically-elongated structure with fireproof lining, horizontal partitions therein provided with openings at alternately opposite ends, the said partitions being arched and some of them provided with openings in the top of 30 the arches, and the others with openings at the sides of the arches, and injectors arranged at the side openings for directing jets of steam or air through said openings into the chambers beneath the partitions in proximity 35 to the openings at the sides of the partitions, substantially as shown and described.

GEORGE ANDERSON RICHARD.

Witnesses:

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