

J. F. DONAGHY.

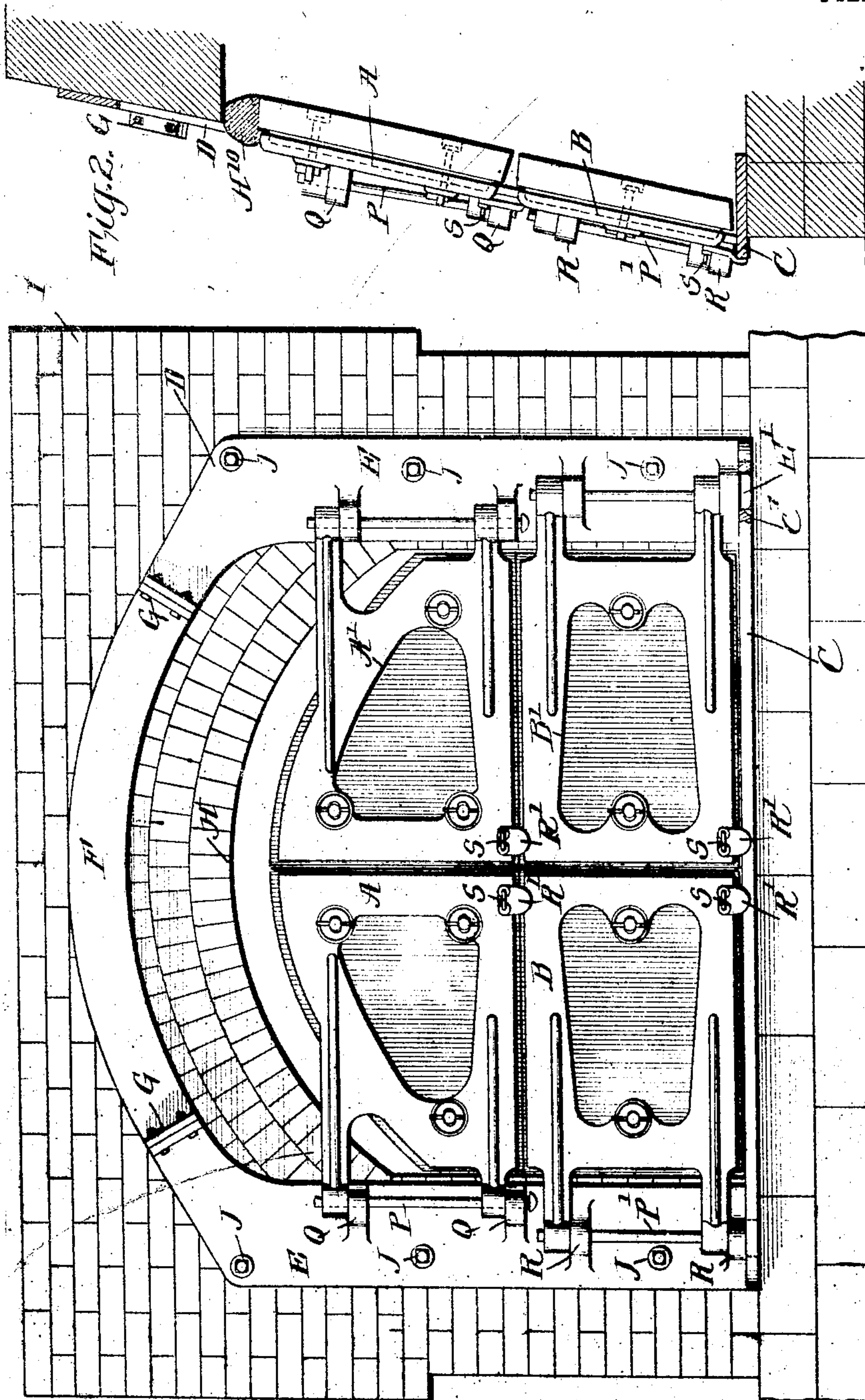
COKE OVEN.

APPLICATION FILED MAR. 7, 1808.

914,932.

Patented Mar. 9, 1909.

2 SHEETS—SHEET 1.



WITNESSES

Samuel E. Wade  
Perry B. Insipie

Fig. 1.

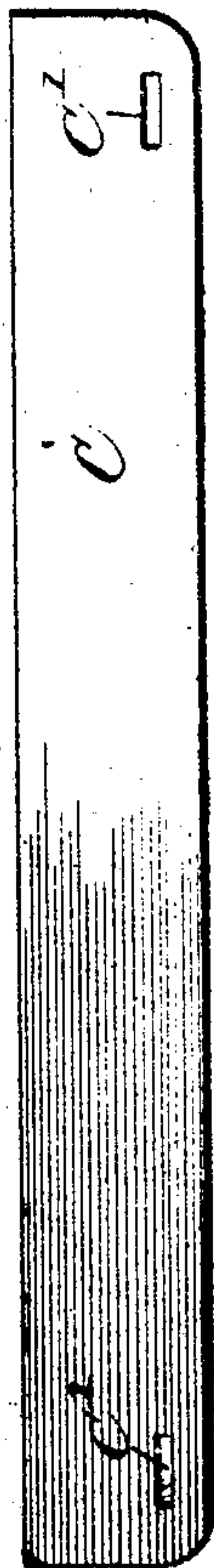
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Fig. 9.



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Fig. 5.

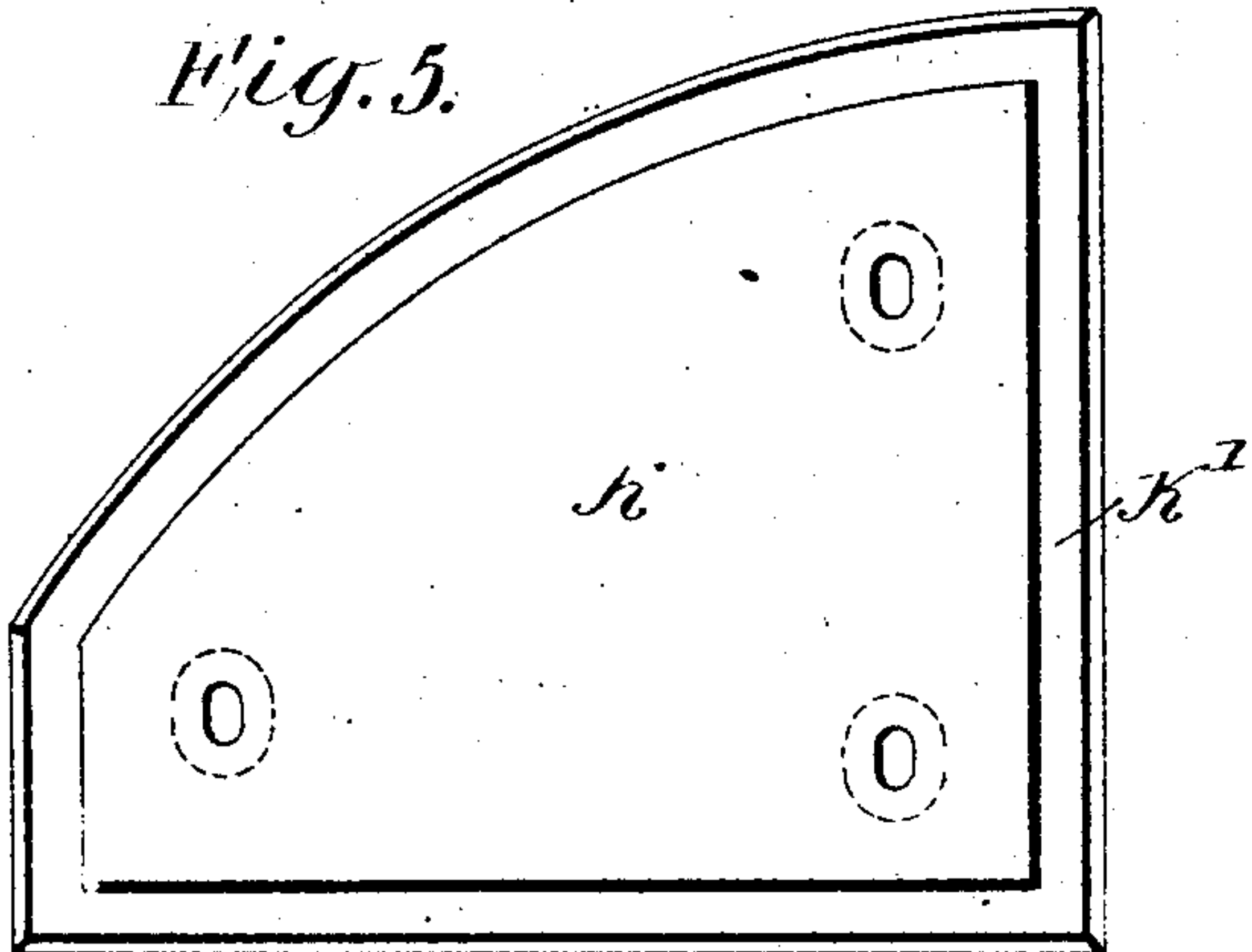


Fig. 6.

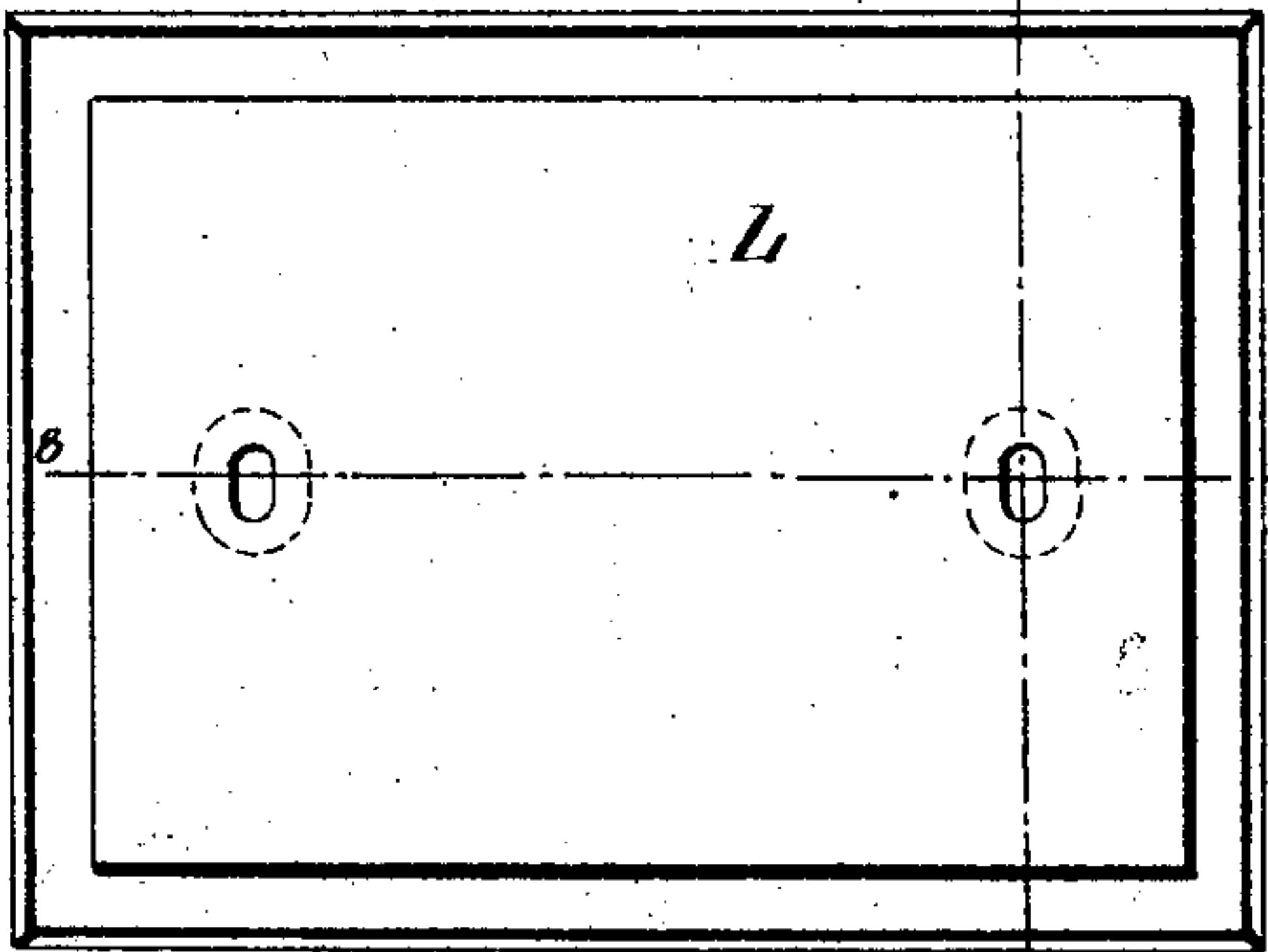


Fig. 8.

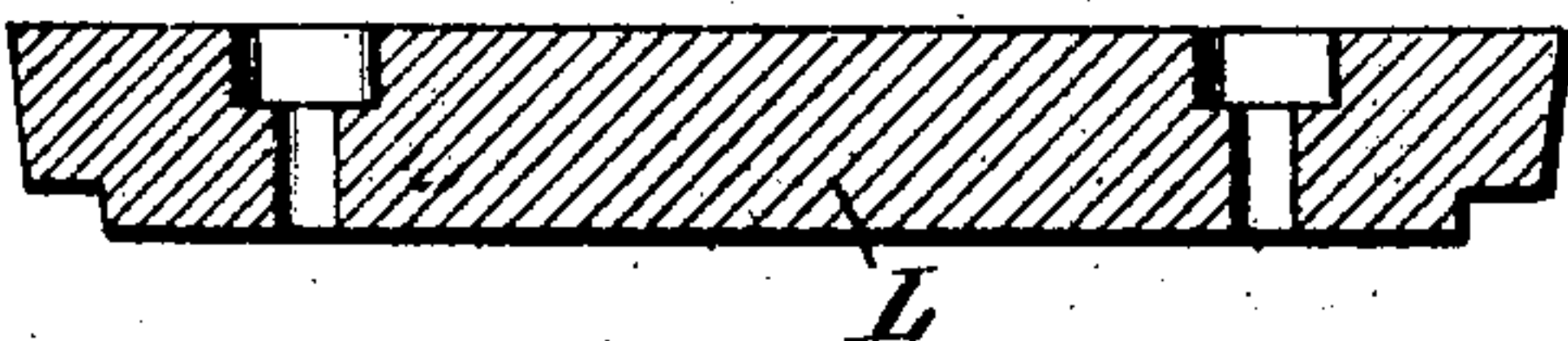


Fig. 7.

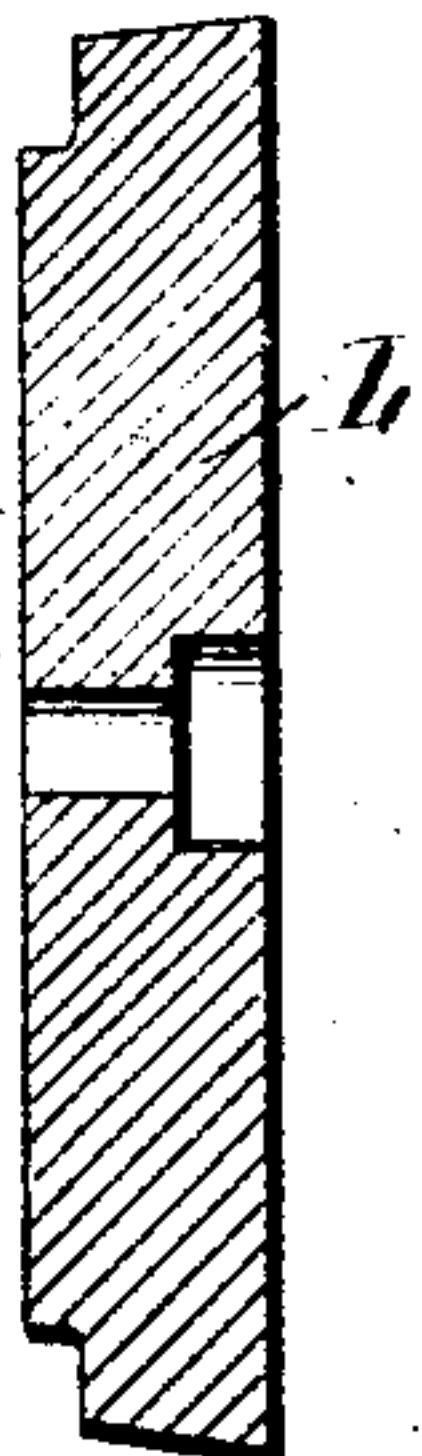
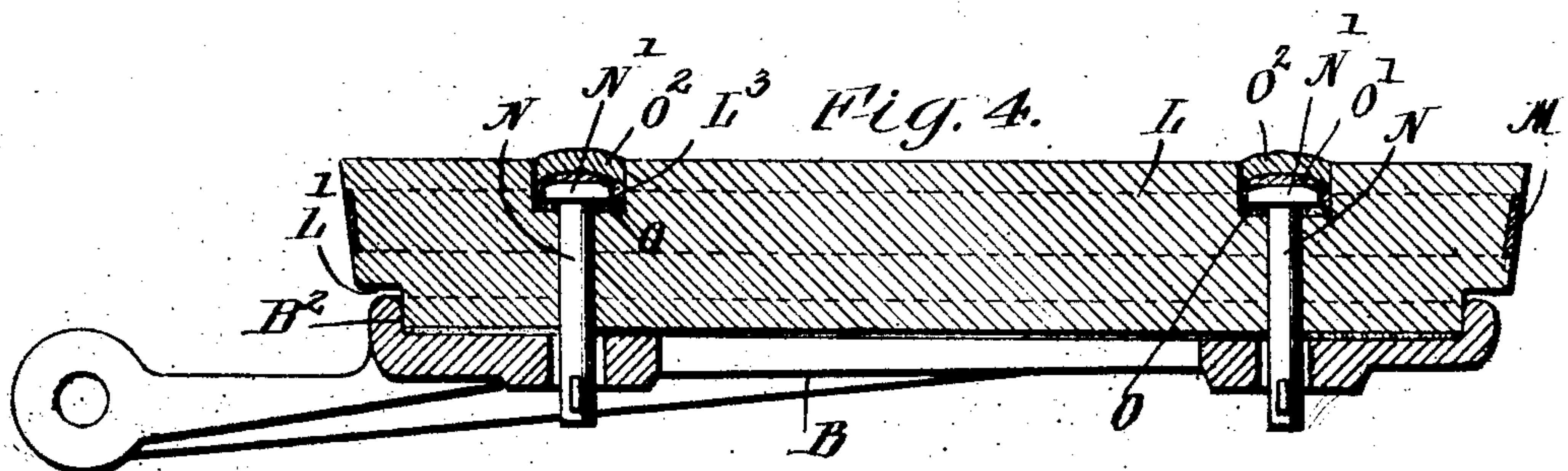
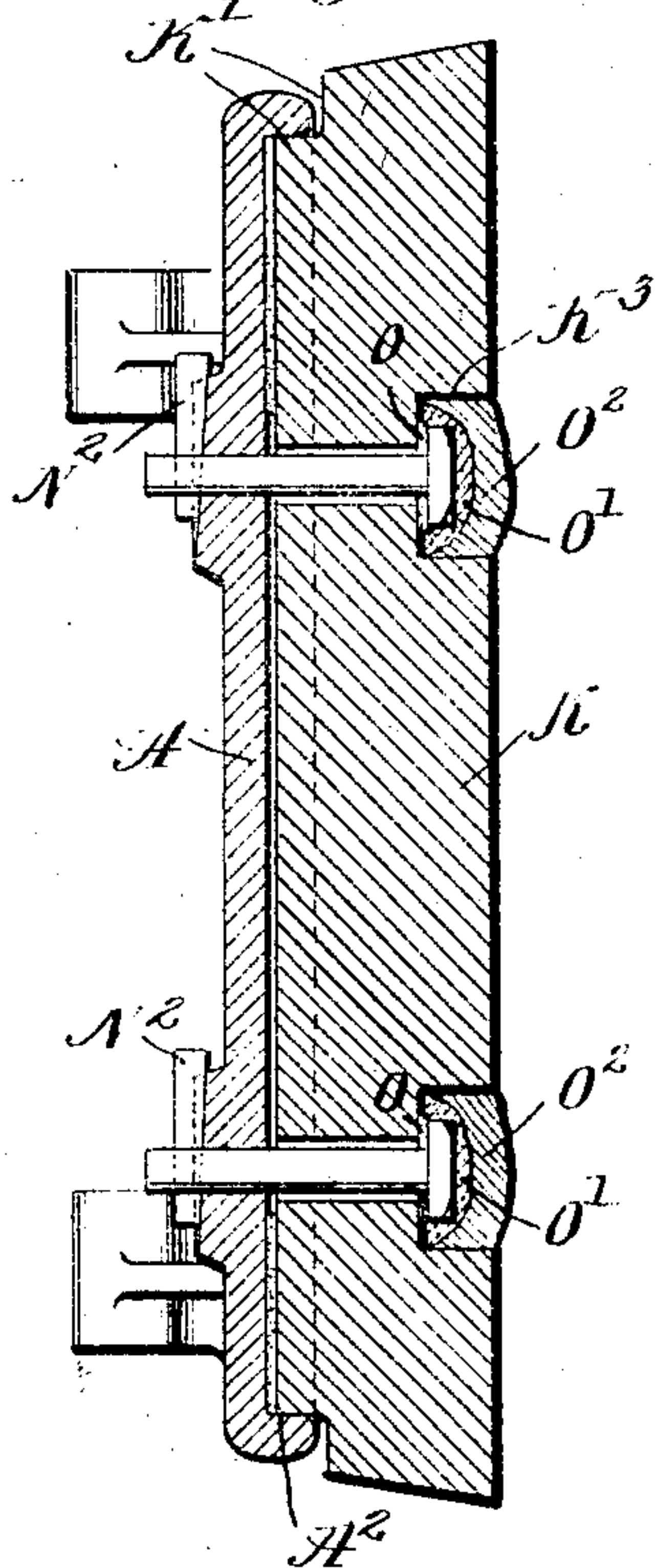


Fig. 3.



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# UNITED STATES PATENT OFFICE.

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## COKE-OVEN.

No. 914,932.

Specification of Letters Patent.

Patented March 9, 1909.

Application filed March 7, 1908. Serial No. 419,761.

*To all whom it may concern:*

Be it known that I, JOSEPH F. DONAGHY, a citizen of the United States, and a resident of Charleroi, in the county of Washington and State of Pennsylvania, have invented certain new and useful Improvements in Coke-Ovens, of which the following is a specification.

This invention is an improvement in coke ovens and particularly in the means for closing the ends of the oven; and the invention consists in certain novel constructions and combinations of parts as will be hereinafter described and claimed.

In the drawings Figure 1 is a front view of a coke oven embodying my invention. Fig. 2 is a vertical longitudinal section of one end thereof. Fig. 3 is a detail vertical section of one of the doors. Fig. 4 is a horizontal section of one of the doors. Fig. 5 is an elevation of the outer side of one of the upper door tiles. Fig. 6 is a similar view of one of the lower door tiles. Figs. 7 and 8 are sections on respectively the lines 7—7 and 8—8 of Fig. 6, and Fig. 9 is a detail plan view of the base plate of the door frame.

In carrying out my invention I employ the upper doors A, the lower doors B and the frame for holding said doors comprising a base plate C and a crown plate D having the uprights E and the arch F, and which may be made in sections bolted together at G, and flanged to facilitate such bolted connection as will be understood from Figs. 1 and 2 of the drawing. By this flanged construction it will be noticed that the arch is adapted to be adjusted by the insertion of filling plates between the flanges to enable the side plates to be moved farther apart whenever desired. In carrying out this construction the side plates have the inwardly projecting wings at their upper ends which are connected to the arch bar as best shown in Fig. 1 of the drawing. It will also be noticed that the arch bar and the upright side plates do not fit within the opening in the end of the oven but are fitted flat against the end of the oven and away from the opening, see Fig. 1, so that they will be protected from the heat. It will be noticed that the arch F is arranged considerably above the arch H of the oven I and is shown as arranged several courses of brick above the crown of the arch H, and also considerably above the upper edges of the upper doors A, and it will be noticed that the upper edges of the said doors A are con-

siderably below the crown of the arch H of the coke oven, this construction being especially designed for coke oven purposes for several reasons. In the first place it is important to arrange the arch F as high as practicable above the crown of the arch H in order to avoid as far as practicable the over-heating of the arch F by the heat which may at times be discharged at the ends of the oven. Again this relative arrangement of the arch F permits the replacing of the bricks of the arch H at the ends of the oven without displacing the door frame, and the location of the upper edges of the doors A below the crown of the arch F facilitates the filling in of the oven opening at the crown of the arch by mud bricks and the like as is commonly practiced, so such mud and brick may be removed when desired in the operation of coking, as is well known to those skilled in such art.

The uprights E are provided at their lower ends with lugs E' fitting in notches C' in the plate C thus tying the uprights and said base plate together, and the construction as shown forms a rigid door frame braced at top and bottom so the weight of the doors cannot cause them to sag in the use of the invention, it being understood that the said doors are quite heavy and require a particularly strong frame to prevent such sagging as the doors are used, especially under the influence of heat.

The door frames are bolted at J securely to the brick work of the oven and operate not only to support the doors but also in a measure to brace the masonry of the oven when applied thereto, as shown in Figs. 1 and 2, it being understood that similar doors are provided at the opposite ends of the oven.

The invention may be applied to the long coke ovens with doors at each end, but can also be used on the bee-hive ovens as well. It is not necessary for the bolts J to extend through the oven as it is only essential to have said bolts anchored in far enough to secure the door frame solidly in place.

The doors A and B are preferably lined with tiles K and L of fire clay or other refractory material, and the said doors are made in the form of open frames as shown at A' and B' in order to permit the air to have access to the tiles to prevent the same from overheating, the doors being recessed on their inner faces at A<sup>2</sup> and G<sup>2</sup> to receive the tiles K and



L, and the tiles K and L are rabbeted at K' and L' forming flange like portions which overlap the doors and protect the same as best shown in Figs. 3 and 4 of the drawings.

5 The edges of the tile taper and converge toward each other toward the outer face of the tile as best shown in Fig. 2 when the doors are closed and this is an important feature as it affords a tapering seat for the clay in luting the joints between the doors and thus prevents the forcing of the clay into the oven and facilitates such operation of luting in an effectual manner as will be understood from Figs. 1 and 2 of the drawings.

10 In Fig. 4 I illustrate a clamping band M encircling the tile and clamping the edges thereof in such manner as to aid in preventing cracking of the tile under the influence of heat and also holding the fragments of the tile should it become cracked. In securing the tile to the doors I employ bolts N having heads N' at their inner ends seated in sockets K<sup>3</sup> and L<sup>3</sup> in the inner faces of the tile and communicating with the bolt holes through which the shanks of the bolts extend, the outer ends of the bolts being secured by keys N<sup>2</sup> as shown in Figs. 3 and 4. The heads N' seat against asbestos washers O and asbestos paste O' is applied over the heads N' after which a fire clay or other refractory plastic O<sup>2</sup> is applied over the asbestos paste as best shown in Figs. 3 and 4, thus protecting the heads of the bolts from injury by the fire in the oven.

35 It will be noticed from Figs. 5 and 6 that the bolt openings in the tiles K are elongated, such construction permitting an adjustment of the tiles within their supporting frames and in such manner as to secure the desired accurate fitting in the use of the invention.

40 The doors A and B are hinged by the pintles P and P' to the door frame. It will be noticed from Fig. 1, that these pintles P and P' are out of alinement and the hinge knuckles Q on the door frame for the upper doors, are out of alinement with the knuckles R on said frame for the lower doors, so that the upper knuckles Q will not interfere with withdrawing the lower pintles P', thus enabling the removal of the lower doors without interfering with the upper doors whenever desired. It will also be noticed that

while the general inclination of the doors is inward toward their upper ends, the axes of the hinges of the upper doors approach the vertical, this being best shown in Fig. 2. This enables the arrangement of the upper doors at an inclination and facilitates the opening of said doors by swinging them on an axis at an angle less than that of the door and approaching the vertical as distinguished from an inclined axis so the doors may be easily opened, this arrangement of the hinges of the upper doors being especially advantageous, because the said doors being arranged so high, would be very difficult to open should the hinges be at any considerable incline.

In operation it will be understood that after the oven is charged and the doors closed, the opening between the upper edges of the top doors and the crown of the oven arch, may be filled in as usual the doors supporting such filling H<sup>10</sup> when the latter is applied as shown in Fig. 2 of the drawings.

The doors are provided near their swinging edges with depending stop plates R' and adjacent thereto with loops or staples S which latter may be engaged by hooks in opening the doors.

I claim:

1. In a door mechanism for coke ovens, the combination with the frame of upper and lower doors hinged thereto, the pintles of the upper doors being arranged more nearly vertical than the door frame to facilitate the opening of said doors, substantially as set forth.

2. The combination of a coke oven, a door frame secured to the end thereof and having an arch plate located considerably above the arch of the oven whereby the bricks of the latter may be removed and replaced without interfering with the arch plate of the door frame, upper and lower doors and hinges securing the same to the door frame, the pintles of the upper hinges being arranged more nearly vertical than the door frame to facilitate the opening of said doors, substantially as set forth.

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Witnesses:

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PERRY B. TURPIN.