No. 644,424. Patented Feb. 27, 1900.

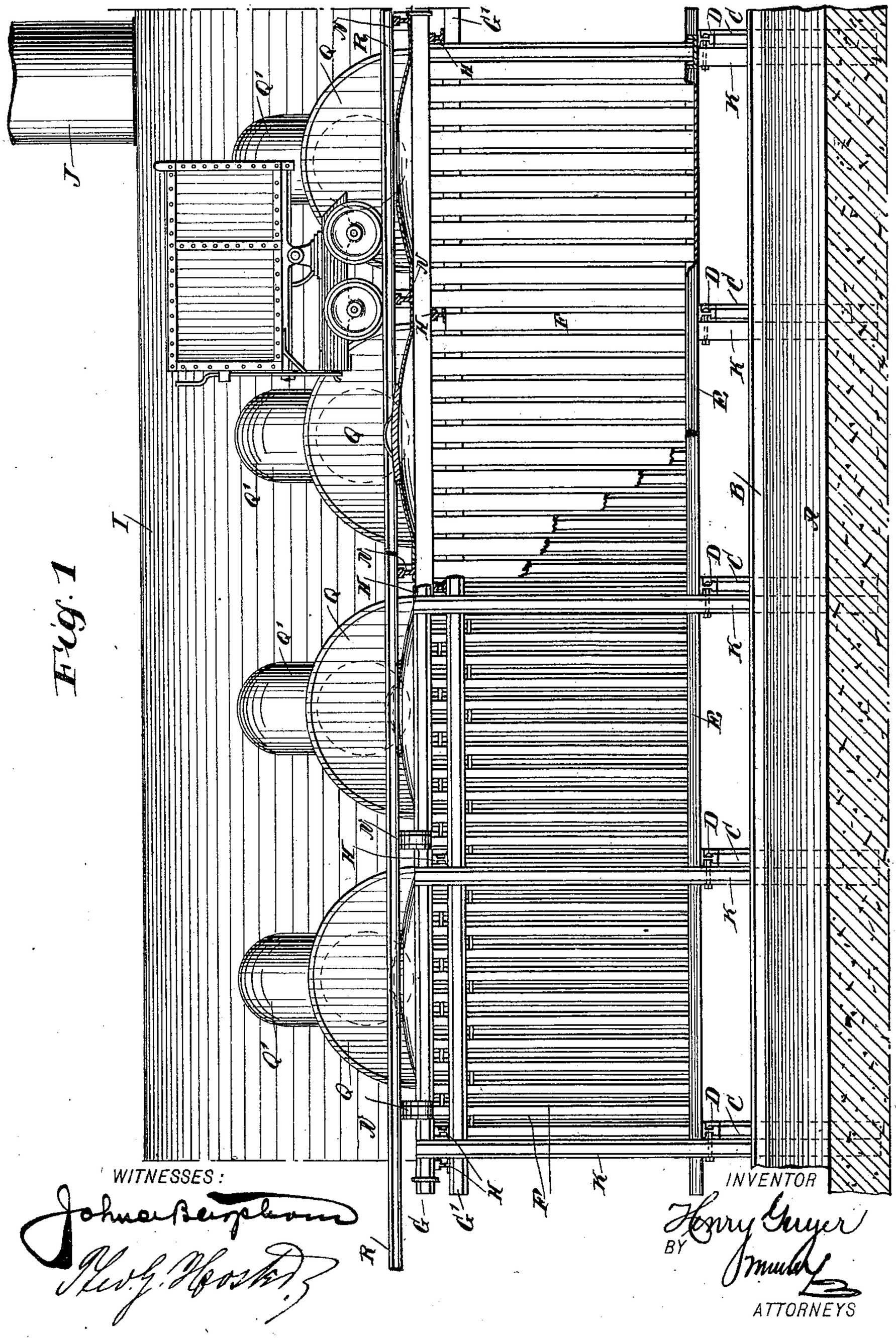
H. GUYER.

FURNACE FOR DESULFURIZING ORES.

(Application filed Sept. 1, 1899.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1



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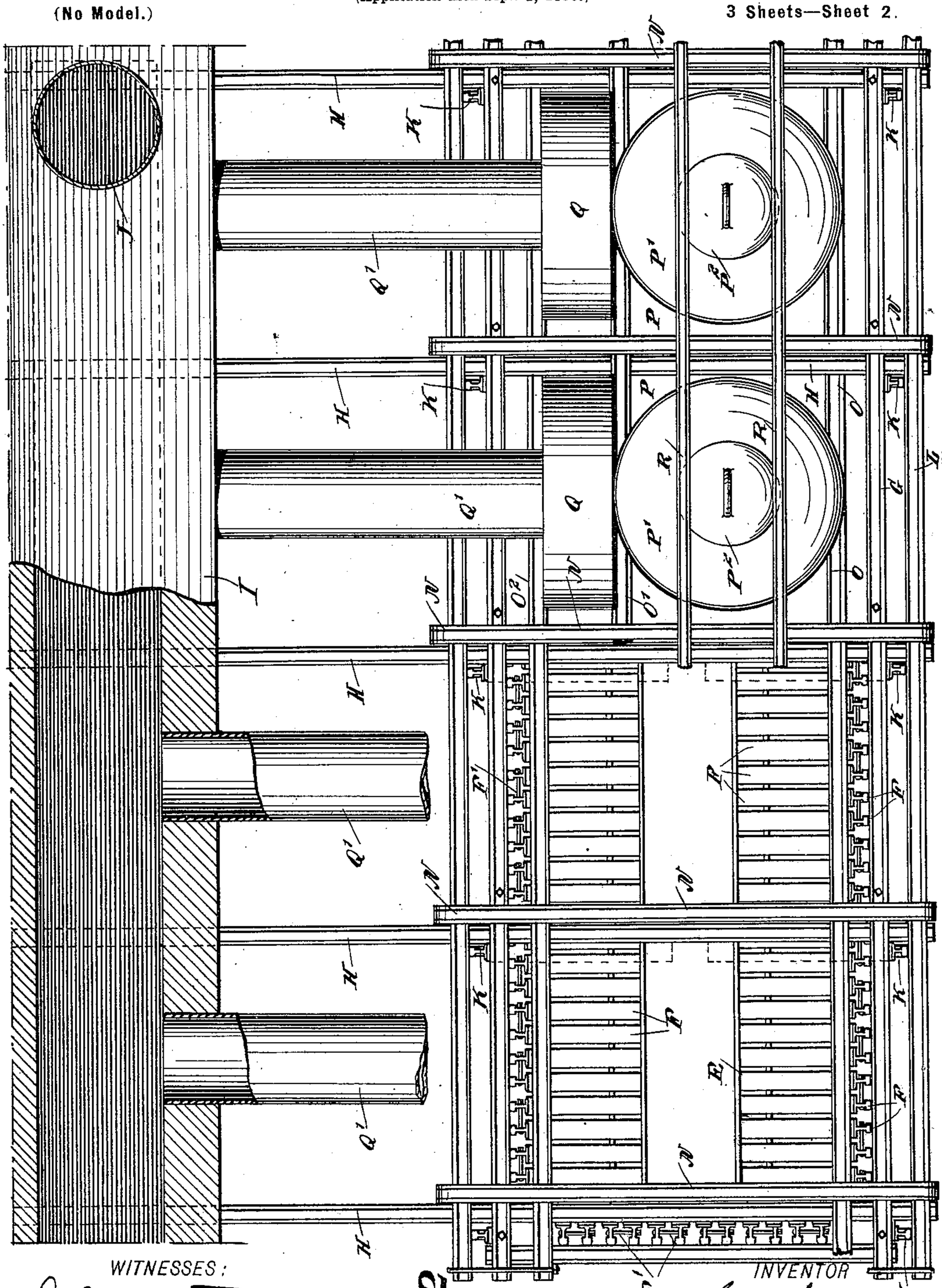

Fig. 2.

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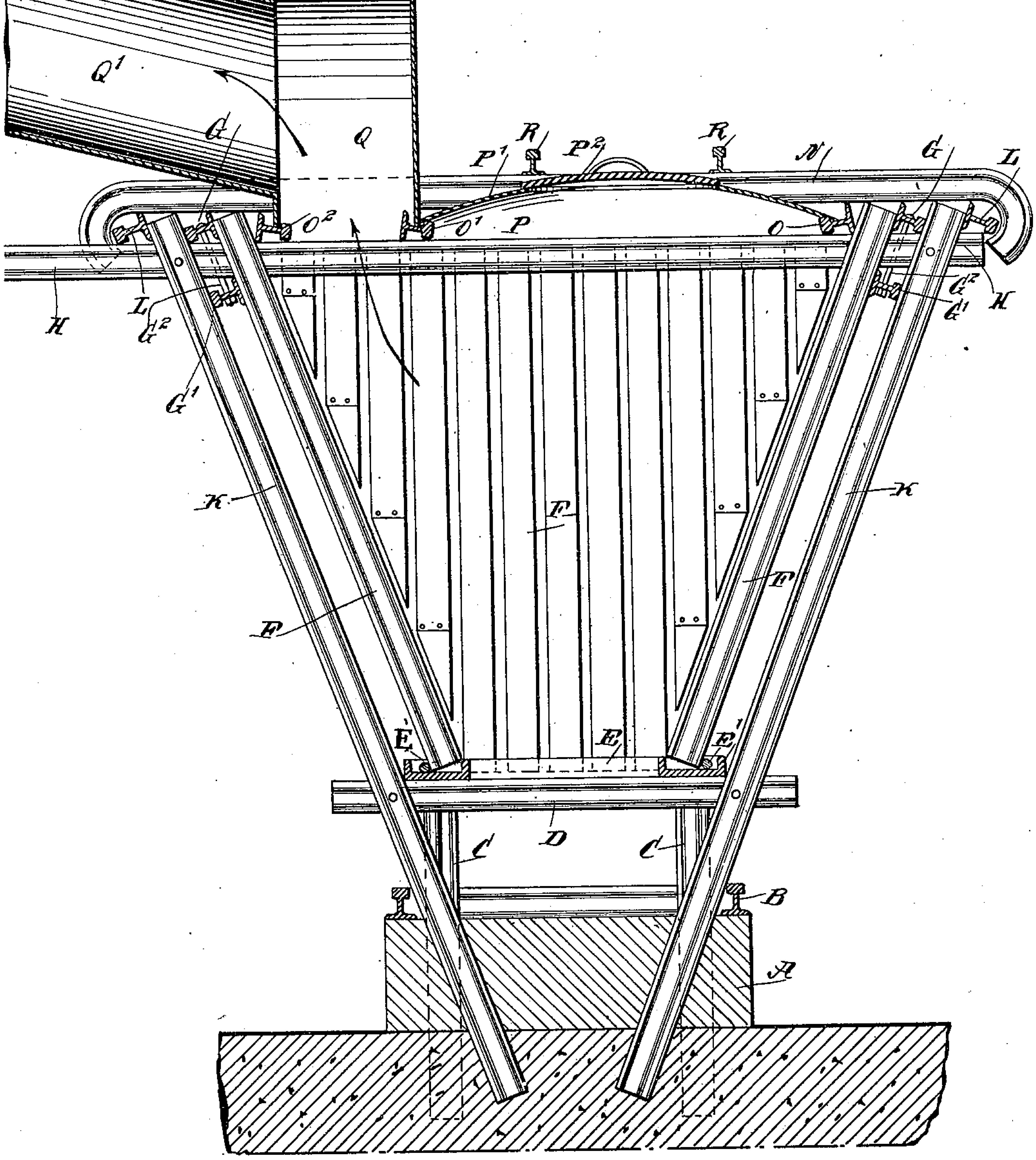
Fig. 3



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FURNACE FOR DESULFURIZING ORES.

SPECIFICATION forming part of Letters Patent No. 644,424, dated February 27, 1900.

Application filed September 1, 1899. Serial No. 729,148. (No model.)

To all whom it may concern:

Be it known that I, HENRY GUYER, a citizen of the United States, residing at Casapalca, Peru, have invented a new and Improved Ore-Desulfurizing Furnace, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved ore-desulfurizing furnace which is simple and durable in construction, very effective in operation, and arranged to treat very large quantities of ore at a time, or more especially designed to desulfurize ore in lump form and without the use of fuel in case the ores contain, say, from fifteen per cent. to forty per cent. sulfur.

The invention consists of novel features and parts and combinations of the same, as will be fully described hereinafter and then pointed out in the claims.

A practical embodiment of my invention is represented in the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the improvement with parts broken out and parts in section. Fig. 2 is a plan view of the same with parts broken out and parts in section, and Fig. 3 is a transverse section of the same.

The improved desulfurizing-furnace is built on a suitable foundation A, on the top of which is arranged a sill B, preferably made of railroad-rails, and within this sill extend posts C, set in the foundation A. On the top of two oppositely-arranged posts are placed cross-ties D, supporting an apertured bottom E, made of channel-iron, as is plainly indicated in Fig. 3, and in this channel-iron are set the upwardly and outwardly extending grate-bars F to form the fire-box, the said grate-bars being formed of pieces of railroad-rails placed a suitable distance apart for the admission of air and preferably with two adjacent bars fastened together by bolts F′, as is plainly indicated in Fig. 2, to keep the bars properly spaced.

The lower outer ends of the grate-bars F abut against rods E′, placed in the outer portion of the channel-irons forming the bottom E, so as to hold the inclined grate-bars against displacement in said channel-irons. The upper outer ends of the grate-bars F rest against spaced longitudinal bars G G′, connected with each other at intervals by bolts G^2, and preferably made of rails the same as the posts C, the ties D, and the grate-bars F.

Transverse anchor-rails H extend across the top of the fire-box between the longitudinal bars G G′, and the rear ends of said anchor-rails H are anchored in the brickwork of a flue I, connected with a chimney J. The anchor-rails H are bolted or otherwise secured to binder-posts K, extending outside of the grate-bars F and preferably parallel thereto, their lower ends being embedded in the foundation A and also resting against the inner faces of the sill B, as will be readily understood by reference to Fig. 3. The binder-posts K are arranged alongside and bolted to the cross-ties D to render the whole construction very firm and durable.

The extreme upper outer ends of the binder-posts K are engaged by longitudinal bars L, resting on the anchor-rails H and engaged by the bent outer ends of transverse holding-beams N, extending over the sheet-metal top or roof P for the fire-box, said top resting on longitudinal roof-supporting beams O O′, supported on the anchor-rails H. The beam O′ also serves to support the outer end of the flue-box Q, the inner end of which rests on a third supporting-beam O^2. (See Fig. 3.) Each of the flue-boxes Q is connected by an upwardly-extending transverse flue-pipe Q′ with the flue I, previously described.

In the roof P are arranged covers P′, having removable lids P^2, through which the ore is passed into the fire-box, preferably from a car mounted to travel on track-rails R, supported on the holding-beams N.

In using the furnace the fire-box formed by the bottom E and the inclined grate-bars F is filled with the ore to be desulfurized through the covers P′ when the lids P^2 are removed, and if the ore contains, say, from fifteen per cent. to forty per cent. of sulfur no other fuel is required for keeping the ore burning for the elimination of the sulfur, it being understood that the rising fumes readily pass into the flue-boxes Q and by the flue-pipes Q′ into the flue I and to the chimney J. As the fire-box is open on all sides and at the bottom, free access is had to the burning material con-

tained in said fire-box, so that a thorough elimination of the sulfur takes place, the desulfurized ore gradually passing through the opening in the bottom E down upon the foundation A to be removed therefrom as the desulfurizing progresses, it being understood that the bottom E is a suitable distance above the top of the foundation A, so that some of the ore can accumulate and be pushed over the foundation by suitable tools in the hands of the operator.

The whole structure is very durable in construction, being chiefly composed, so far as the fire-box is concerned, of railroad-rails, channel-iron, and sheet metal.

The furnace as constructed is intended to take the place of heap or stall roasting of lump ores of a size passing through a two-and-a-half-inch ring down to a three-quarter-inch-mesh screen.

A furnace, say, of twenty-four feet length—that is, the length of an ordinary railroad-rail—is capable of quickly desulfurizing from seven to ten tons of ore in about twenty-four hours, the ores containing over fifteen per cent. of sulfur. Ores charged into the furnace can be discharged in about two days, allowing of drawing the ore from the bottom completely burned out and in a cold condition.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. An ore-desulfurizing furnace, provided with a hopper-shaped fire-box consisting of a channel-iron bottom having a central opening, grate-bars set in the said channel-iron bottom and extending upwardly and outwardly, longitudinal binding-bars and transverse anchor-rails for the upper ends of the said grate-bars, and a sheet-metal cover for the said fire-box and having openings and flue-boxes, substantially as shown and described.

2. An ore-desulfurizing furnace, provided with a hopper-shaped fire-box consisting of a channel-iron bottom having a central opening, grate-bars set in the said channel-iron bottom and extending upwardly and outwardly, longitudinal binding-bars and transverse anchor-rails for the upper ends of the said grate-bars, and a flue connected with a chimney and by flue-pipes with the said flue-boxes, substantially as shown and described.

3. An ore-desulfurizing furnace, provided with a hopper-shaped fire-box consisting of a channel-iron bottom having a central opening, grate-bars set in the said channel-iron bottom and extending upwardly and outwardly, longitudinal binding-bars and transverse anchor-rails for the upper ends of the said grate-bars, and a flue connected with a chimney and by flue-pipes with the said flue-boxes, the said transverse rails having their ends anchored in the masonry of the said flue to give stability to the fire-box, substantially as shown and described.

4. An ore-desulfurizing furnace provided with a hopper-shaped fire-box, consisting of a channel-iron bottom having a central opening, grate-bars set in the said channel-iron bottom and extending upwardly and outwardly, longitudinal binding-bars and transverse anchor-rails for the upper ends of said grate-bars, and binder-posts set in a foundation and extending outside of the grate-bars and approximately parallel thereto and fastened at their upper ends to the transverse anchor-rails.

5. An ore-desulfurizing furnace, comprising a series of posts, cross-ties on said posts, a fire-box set on said cross-ties and provided with a channel-iron bottom resting on the cross-ties, grate-bars set in the channel-iron bottom and extending upwardly and outwardly, longitudinal binding-bars for the upper ends of the grate-bars, transverse anchor-rails for said binding-bars and grate-bars, binder-posts outside of the grate-bars and connected with the said anchor-rails, substantially as shown and described.

6. An ore-desulfurizing furnace, comprising a series of posts, cross-ties on said posts, a fire-box set on said cross-ties and provided with a channel-iron bottom resting on the cross-ties, grate-bars set in the channel-iron bottom and extending upwardly and outwardly, longitudinal binding-bars for the upper ends of the grate-bars, transverse anchor-rails for said binding-bars and grate-bars, binder-posts outside of the grate-bars and connected with the said anchor-rails, longitudinal bars for the said binder-posts, and transverse holding-beams having curved ends for engagement with the said longitudinal binder-post bars, substantially as shown and described.

7. An ore-desulfurizing furnace, comprising a series of posts, cross-ties on said posts, a fire-box set on said cross-ties and provided with a channel-iron bottom resting on the cross-ties, grate-bars set in the channel-iron bottom and extending upwardly and outwardly, longitudinal binding-bars for the upper ends of the said grate-bars, transverse anchor-rails for said binding-bars and grate-bars, binder-posts outside of the grate-bars and connected with the said anchor-rails, and a sheet-metal roof on supporting-beams carried by the anchor-rails, the roof having charge-lids and flue-boxes, substantially as shown and described.

8. An ore-desulfurizing furnace, comprising a series of posts, cross-ties on said posts, a fire-box set on said cross-ties and provided with a channel-iron bottom resting on the cross-ties, grate-bars set in the channel-iron bottom and extending upwardly and outwardly, longitudinal binding-bars for the upper ends of the grate-bars, transverse anchor-rails for said binding-bars and grate-bars, binder-posts outside of the grate-bars and connected with the said anchor-rails, longitu-

dinal bars for said binder-posts, transverse holding-beams having curved ends for engagement with the said binder-post bars, track-rails on the said transverse holding-beams, and a roof under the track-rails and carried on supporting-beams resting on the anchor-rails, said roof having charge-lids and flue-boxes, substantially as shown and described.

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