

G. VINING.

# APPARATUS FOR DESULFURIZING AND DISINTEGRATING METALIC ORES.

No. 49,322.

Patented Aug. 8, 1865.

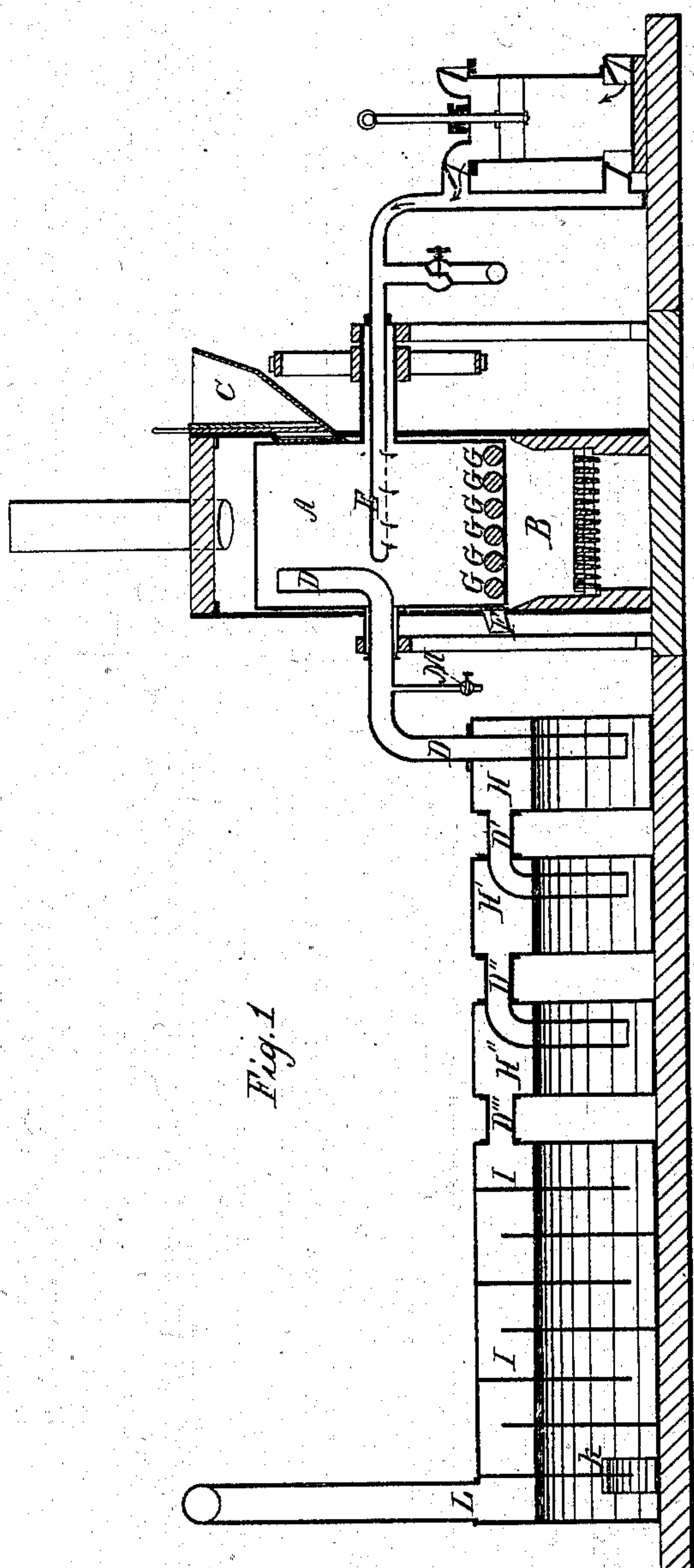


Fig. 1

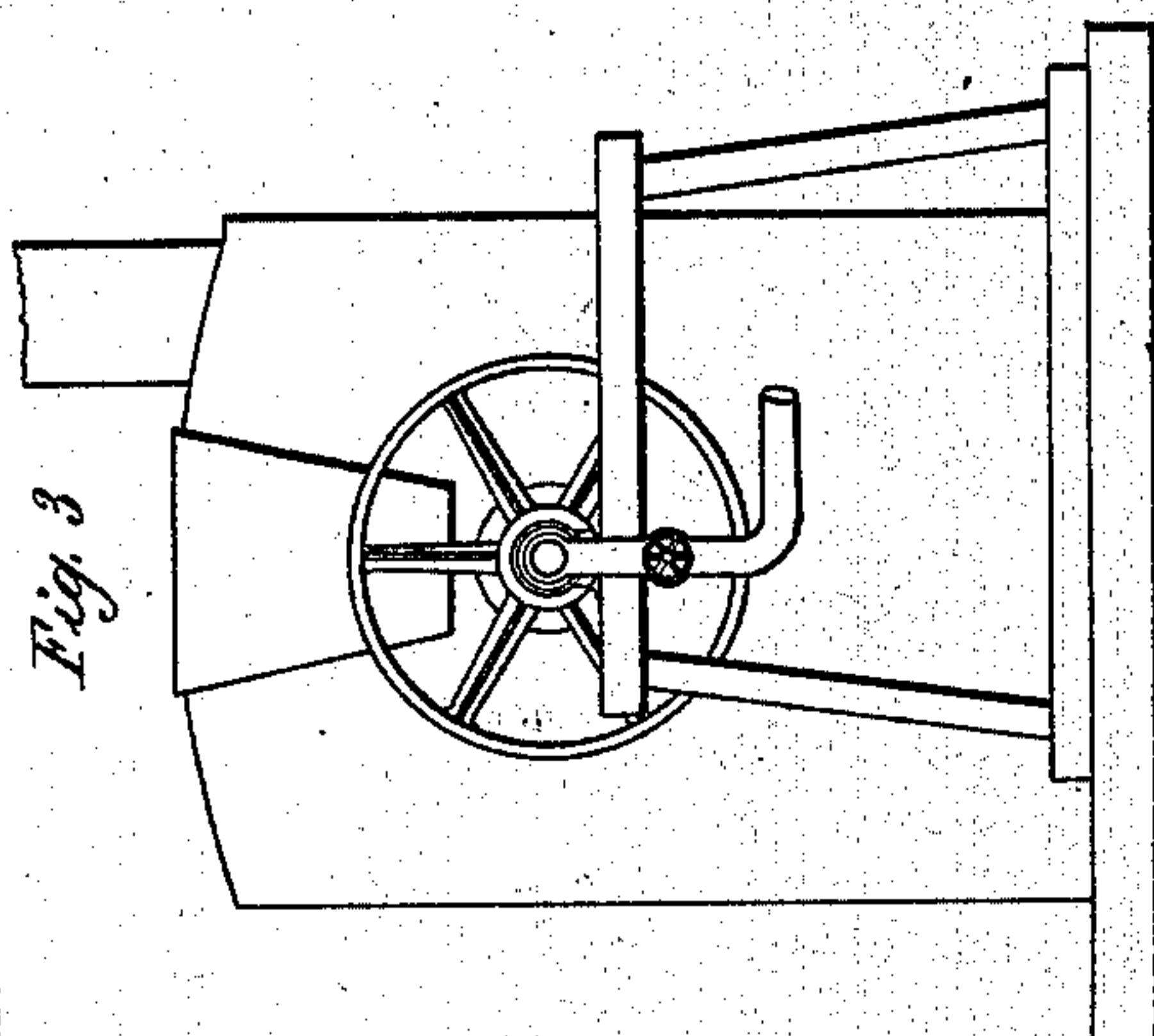


Fig. 3

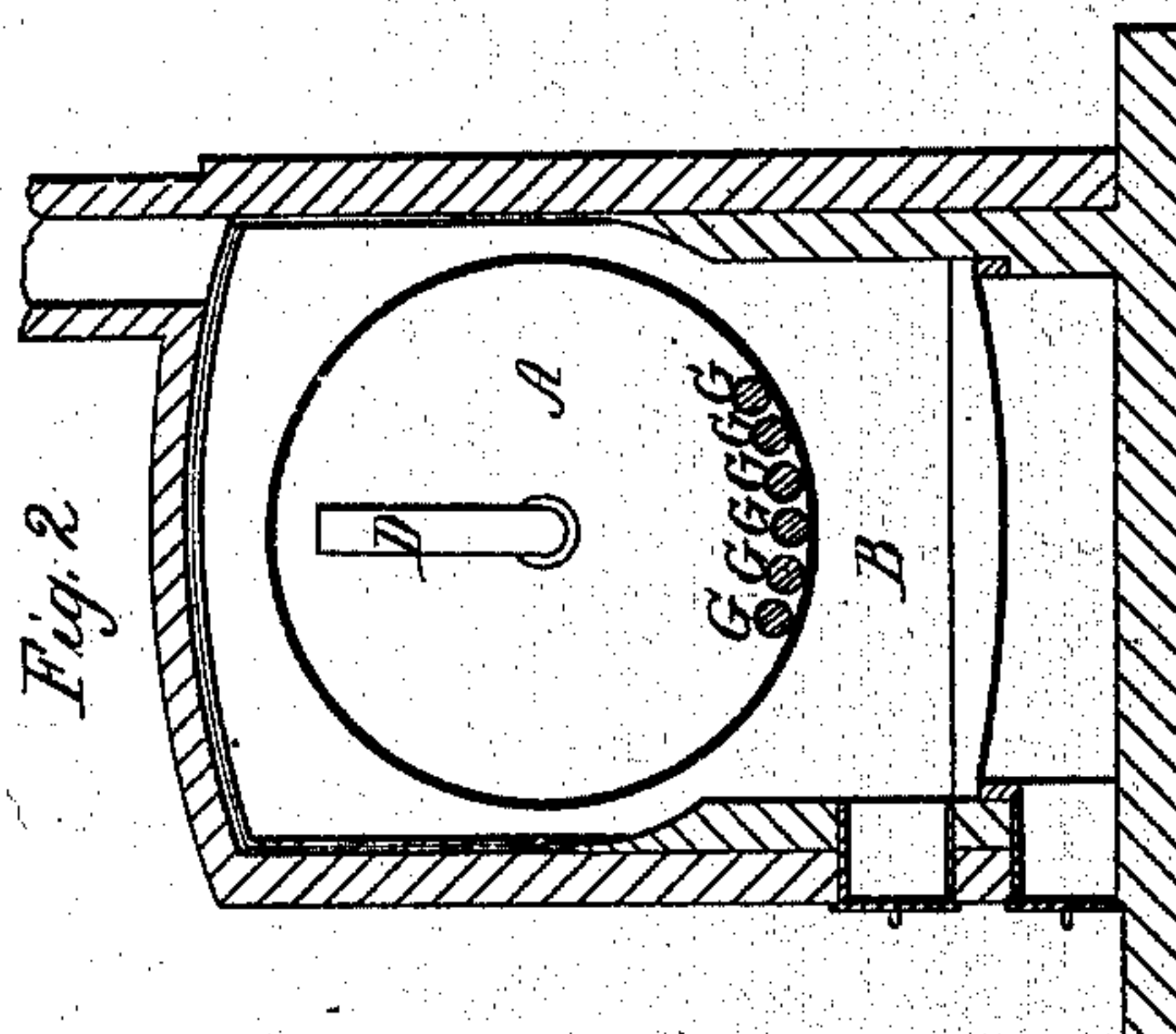


Fig. 2



# UNITED STATES PATENT OFFICE.

GEORGE VINING, OF BOSTON, MASSACHUSETTS.

## IMPROVEMENT IN DESULPHURIZING AND DISINTEGRATING ORES.

Specification forming part of Letters Patent No. 49,322, dated August 8, 1865.

*To all whom it may concern:*

Be it known that I, GEORGE VINING, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Apparatus for Desulphurizing and Disintegrating Metallic Ores.

My invention consists in introducing the already pulverized ore into a closed vessel, into which compressed air or other gases are admitted, and there by mechanical means prevent the ores from being coated by oxide or other substances, and thereby expose a free metallic surface to the action of agencies for the reduction of baser metals. I also create a pressure causing the gases to penetrate more thoroughly the substances to be operated upon, prevent the escape of matter by blast or draft, either by precipitating or holding them in solution.

To enable others to make and use my invention, I will proceed to describe it by reference to the accompanying drawings.

The same letters refer to the same parts.

Figure 1 represents a longitudinal section of the apparatus. Fig. 2 represents a transverse section of it; and Fig. 3 represents an end elevation.

There is a drum, A, Figs. 1 and 2, revolving slowly within a furnace, B, having a connection with hopper C for the admittance of pulverized ore and an aperture, F, for the removing of the desulphurized and disintegrated metal. There is a tube, E, perforated on the under side as far as it reaches into the revolving cylinder A, for the introduction of the compressed air or other gases, and a tube, D, having its inlet near the highest elevation of cylinder A, for the escape of the gases into the next vessel. A number of balls, G G G G G G, &c., roll within the said cylinder A. Tube D, with cock M, leads to a closed vessel or seal, H, Fig. 1, said vessel being partially filled with water, acid, or alkaline solution. The outlet of tube D has to be below the surface of the above-mentioned fluid, and near the bottom of the seal. Another tube, D', is leading from seal H to a similar one, H', and in like manner an-

other tube, D'', to seal H'', and so on until tube D''' terminates in box I, which is partitioned off, as shown in Fig. 1, having the last partition dip into a vessel, K, filled with mercury. From the last space a pipe, L, carries all obnoxious gases off or into a chimney.

The apparatus has to be used in the following manner: A quantity of pulverized ore being placed through hopper C into a slowly-revolving cylinder, A, and there exposed to the action of heat from furnace B, the balls G G G G G G, &c., distribute the metallic ore more uniformly, and by their constant friction against the ore remove all coating of oxide or other substances, and cause it to present a bright metallic surface to the action of the agents used for the reduction of the baser metals. The tube E introduces a blast of compressed air or gases into the cylinder, which, acting upon the ore, assist the process of desulphurizing, and carries off the freed gases into the seals H H' H'' H''', &c., and box I, where they become condensed, according to their nature, and are precipitated or held in solution, as mentioned above. The seals H H' H'', &c., also arrest the escape of matter, so that there is no loss of the valuable metallic ore.

By opening the cock M, I am enabled to test the nature of the gases in the cylinder, and after the same are all condensed the desulphurized ore is then taken from aperture F.

In this apparatus I do not confine myself to the number of seals H H' H'' H''', &c. This depends on the substance to be operated upon.

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

The revolving cylinder A, in combination with balls G G' G'', &c., or their equivalents, tubes E and D, cock M, and seals H H' H'', &c., constructed in the manner and for the purpose above described.

In witness whereof I have hereunto subscribed my name the 10th day of May, 1865.  
GEO. VINING.

In presence of—

A. KINGSBURY,  
CHAS. E. ALLEN.