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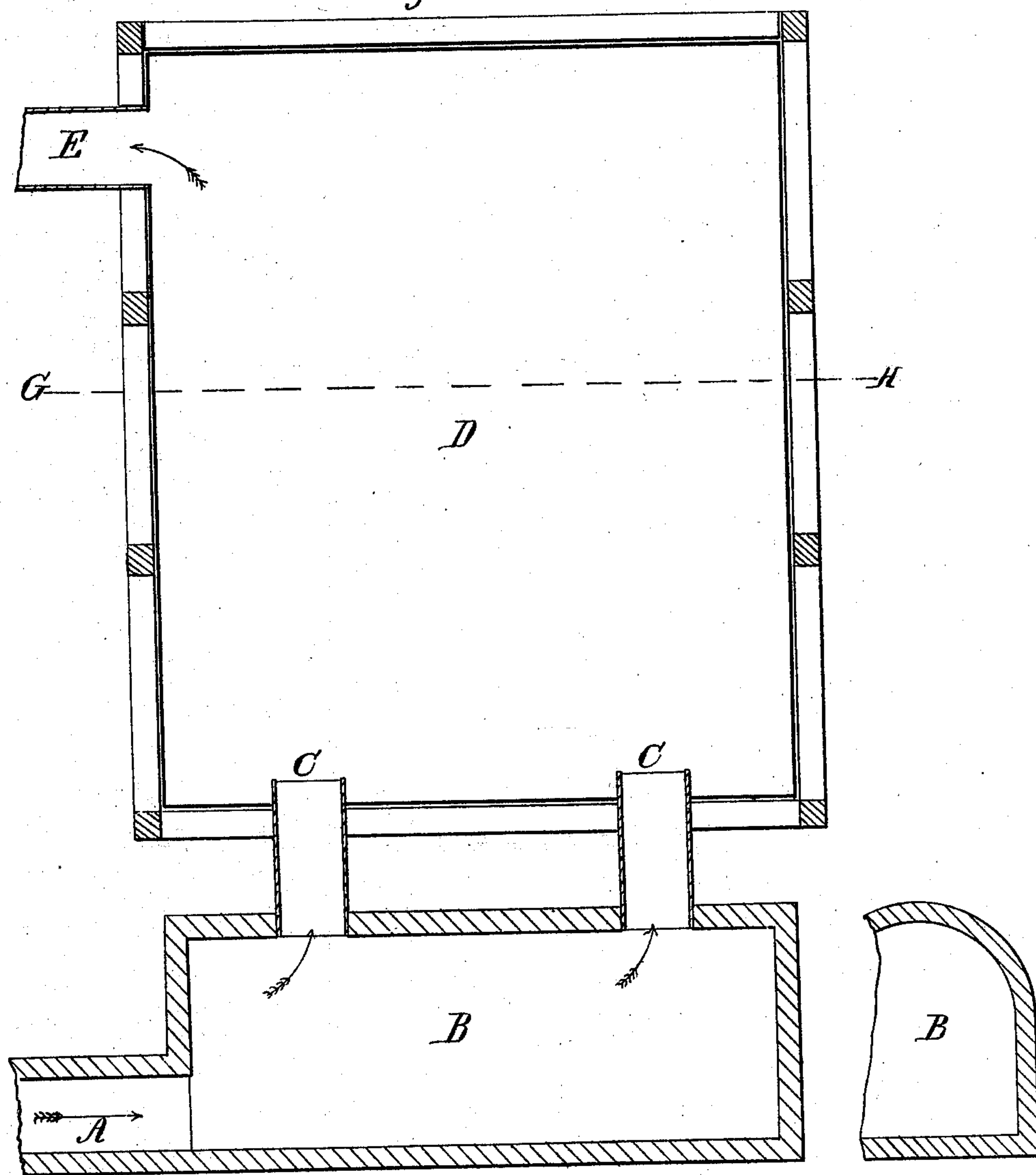
*Bigelow & Baldwin*

*Purifying Gases.*

*Nº 90,067.*

*Patented May 18, 1869.*

*Fig. 1*



*Witnesses*  
*G. Sanford*  
*O. R. Smith*

*Inventors*  
*Artemus Bigelow*  
*James S. Baldwin*

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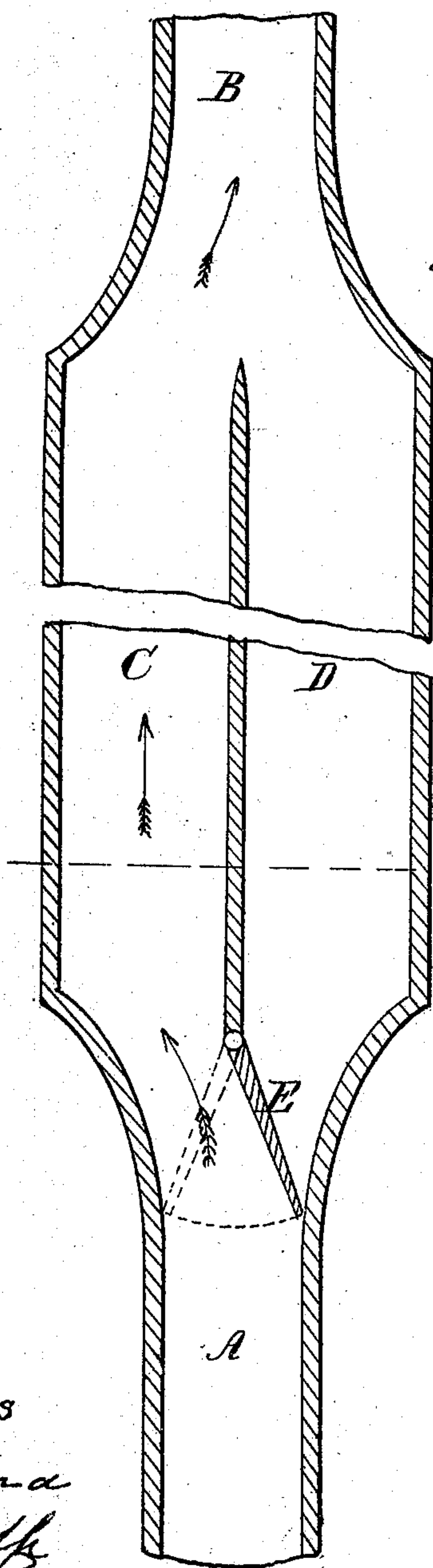


Fig. 3

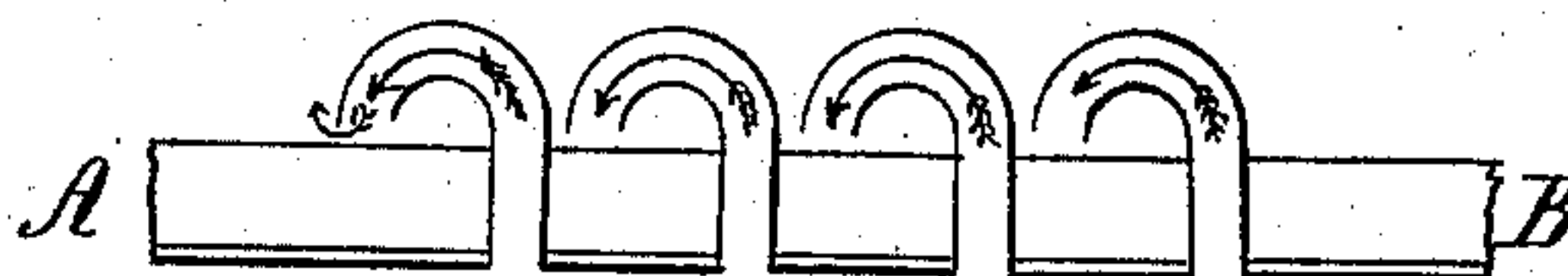
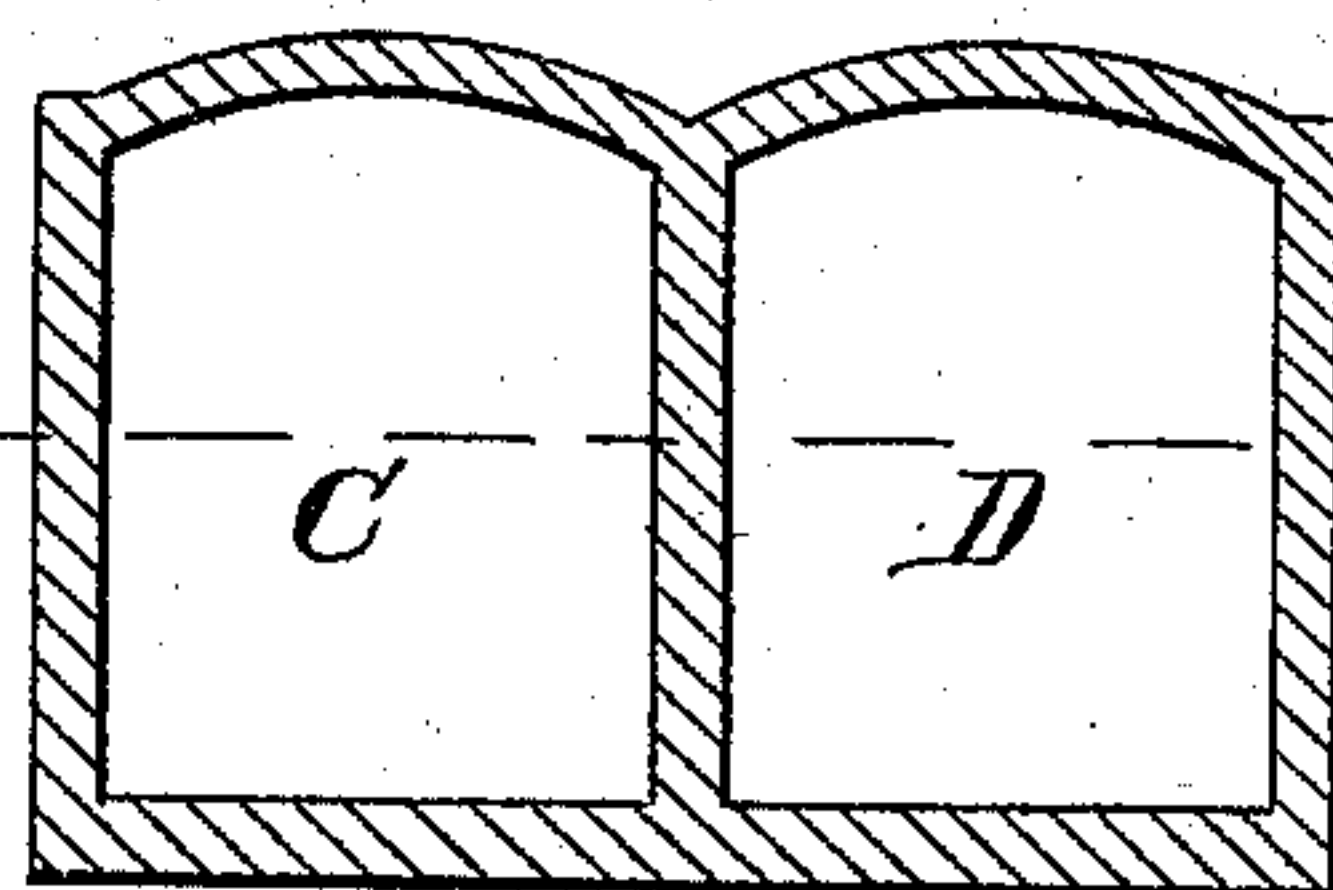


Fig. 2



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# UNITED STATES PATENT OFFICE.

ARTEMAS BIGELOW AND JAMES S. BALDWIN, OF NEWARK, NEW JERSEY,  
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## IMPROVEMENT IN PURIFYING THE WASTE GASES FROM COPPER-ROASTING FURNACES.

Specification forming part of Letters Patent No. **90,067**, dated May 18, 1869.

*To all whom it may concern:*

Be it known that we, ARTEMAS BIGELOW and JAMES S. BALDWIN, of the city of Newark, in the county of Essex and State of New Jersey, have invented a new and useful Method of Purifying the Waste Gases of Copper Roasting and Calcining Furnaces for the manufacture of sulphuric acid; and we hereby declare the following to be a full and sufficient description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making a part of this specification.

The waste gases which pass off when copper ores containing sulphur are roasted or calcined consist of the ordinary products of combustion of the fuel employed, sulphurous acid, and the impurities which it is the object of our invention to remove. These impurities consist of particles of unconsumed fuel, empyreumatic substances, ashes, &c., and if allowed to enter the chambers where the sulphurous acid is converted into sulphuric, the latter would be discolored and otherwise contaminated, and its commercial value seriously impaired. These impurities, which are held in mechanical suspension by the gases already mentioned, are removed either by reducing the current of gas to a state of partial or total quiescence, or by washing it with water during its passage from the furnace to the acid-chambers. We prefer to employ the former method in most cases.

The natural draft of the chimneys may, if necessary, be assisted by steam-jets and revolving fans applied in the usual way.

In the drawing, Figure I shows the means by which the gases are reduced to a state of partial quiescence, whereby the impurities are allowed to settle down.

It is well known that the velocity of a current is inversely as the area of the cross-section of the channel through which it flows. The channel A, into which the gases flow after leaving the furnace, is therefore made somewhat larger than the outlet of the latter, and at B it is still further enlarged and the speed of the current correspondingly reduced. From B the gases pass to the chamber D through the tubes CC. The dimensions of D are such that the flow of the current through it is reduced to an extremely low velocity. From D the gases flow through the channel E to a second or any additional number of chambers having equivalent functions. After

their mechanical impurities are thus removed, the gases pass to the chambers, where the sulphurous acid is utilized in the ordinary way.

When it is desired to bring successive portions of the current to a state of absolute rest, the channel is enlarged and divided into two parts, C and D, Fig. II, which are alternately placed in communication with the main channel A B by turning the damper E.

The floors of the several channels described are, if necessary, covered with a thin stratum of water to retain the impurities as they settle.

That the draft may not be impaired, the channel is in no case contracted below the dimensions of the outlet of the furnace.

In washing the gases, water is showered through any convenient portion of the channel by a force-pump and rose-jet, or equivalent perforated outlet. The water should be used over and over to avoid loss from the absorption of sulphurous acid. In some cases, however, the current of gas is so directed, by screens, tubes, or other suitable deflectors, that it shall impinge upon or pass slightly below the surface of a stratum of water, which will retain the impurities by mechanical adhesion.

Fig. III represents a simple method of accomplishing this result.

A B is a portion of a floor, which in practice would occupy the position G H in the chamber D, Fig. I. This floor sustains a stratum of water, whose upper surface is indicated by the heavy line.

The current of gas is directed by the curved tubes, which, if the draft is sufficiently strong, may dip slightly below the surface of the water. This arrangement may be repeated any desired number of times in D or in subsequent chambers.

What we claim as our invention, and desire to secure by Letters Patent, is—

Removing the impurities held in mechanical suspension by the waste gases of copper roasting or calcining furnaces by washing said gases or reducing the speed of their flow, by the means substantially as described.

ARTEMAS BIGELOW.  
JAMES S. BALDWIN.

Witnesses:

G. SANDFORD,  
O. R. SMITH.