

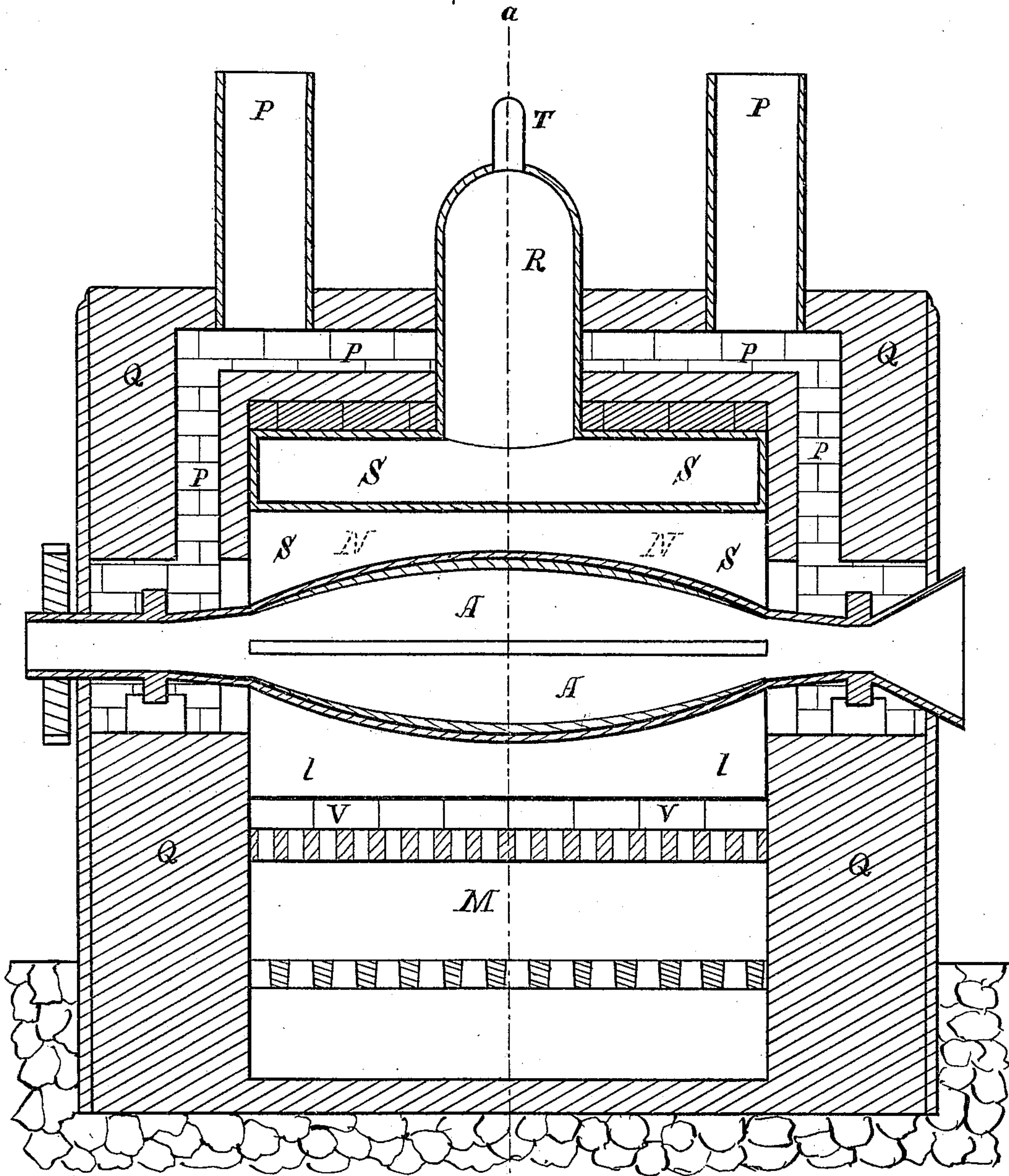
G. L. HARRISON, Jr. & M. C. WILSON.

APPARATUS FOR OXIDIZING METAL.

No. 175,701.

Patented April 4, 1876.

FIG 1



ATTEST—  
W. C. Hawthorne  
William Parent

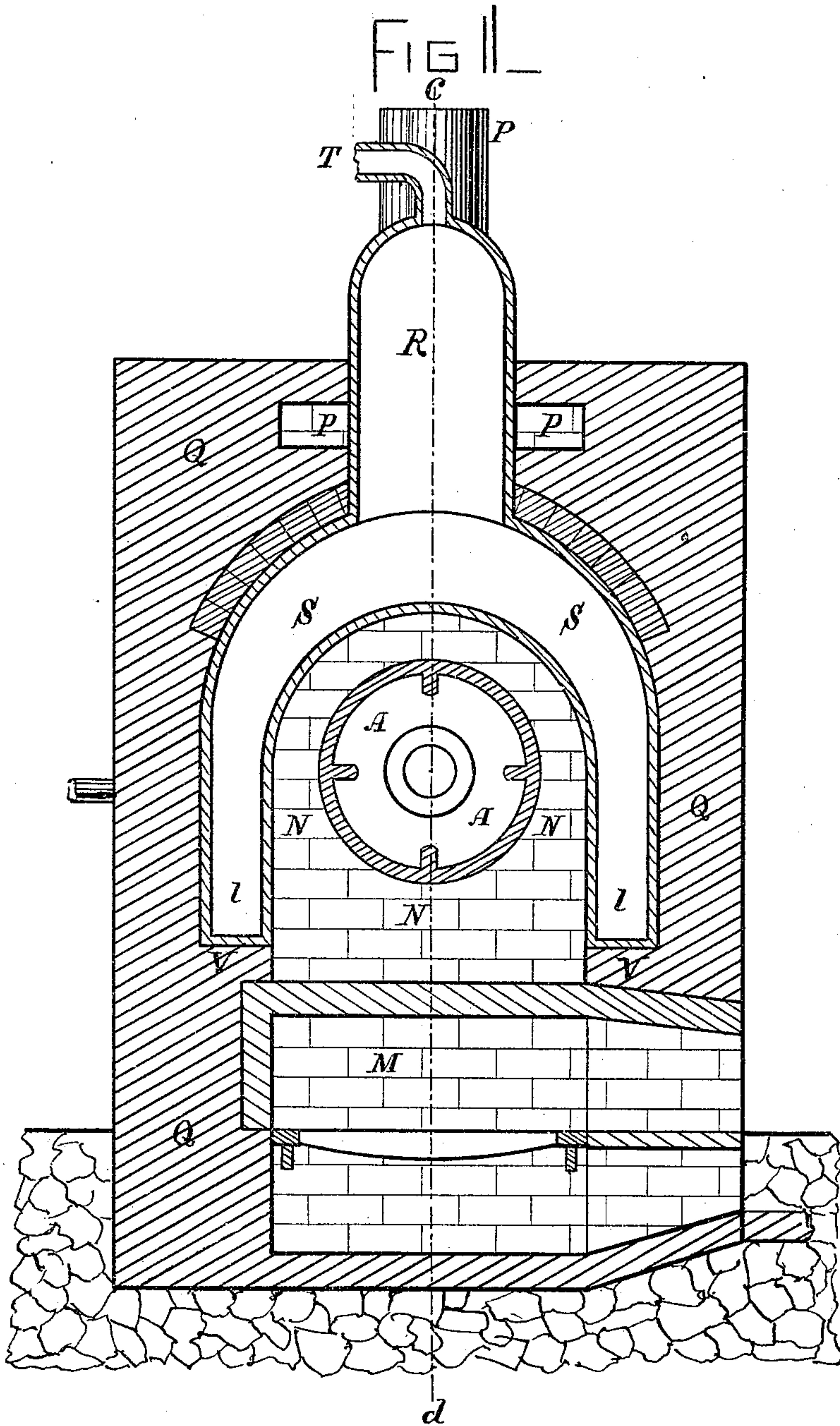
INVENTORS  
George Lieb-Harrison Jr.  
Mortimer C. Wilson  
by their Atty  
Bonsall Taylor

G. L. HARRISON, Jr. & M. C. WILSON.

APPARATUS FOR OXIDIZING METAL.

No. 175,701.

Patented April 4, 1876.



ATTEST  
*W. C. Crawford*  
 William Parent

INVENTORS.  
 George Leib Harrison Jr.  
 Mortimer C. Wilson  
 by their Atty  
*J. Bonsall Taylor*



# UNITED STATES PATENT OFFICE.

GEORGE L. HARRISON, JR., AND MORTIMER C. WILSON, OF PHILADELPHIA,  
PENNSYLVANIA.

## IMPROVEMENT IN APPARATUS FOR OXIDIZING METALS.

Specification forming part of Letters Patent No. **175,701**, dated April 4, 1876; application filed  
November 30, 1875.

*To all whom it may concern:*

Be it known that we, GEORGE LEIB. HARRISON, Jr., of the city and county of Philadelphia, in the State of Pennsylvania, and MORTIMER C. WILSON, of the city of Philadelphia, in the State of Pennsylvania, have invented a new and useful Improvement upon the Apparatus for Oxidizing Metals, for which Letters Patent of the United States were granted to William Atwood, of Cape Elizabeth, Maine, upon the 7th day of March, A. D. 1865, and numbered 46,618, in connection with which Letters Patent the following, which we declare to be a full, clear, and precise description of our improvement, is to be understood.

Atwood's invention consists of a revolving chamber for the oxidation of metals, so constructed as to admit the passage of a constant current of atmospheric air over and through the material to be oxidized, while the same is kept in constant motion and exposed to any desirable degree of heat.

The object of our improvement is, first, to dispense entirely with the outside furnace and boiler requisite in connection with a steam-engine to furnish the motive power to actuate the rotating chamber, by so doing rendering the Atwood apparatus self-operating by a single furnace in all its functions; and, second, to render the effective oxidizing capacity of the furnace greater by so constructing the boiler, inserted as hereinafter described, for the object first above-mentioned, that its crown-sheet shall be correspondent in curvature with the rotating chamber and shall surround the same above in such manner as to act as a reverberating surface, radiating the heat passing up to it around the free extent of both entire sides of the chamber directly back upon the immediate top surface of the same, thus heating it much more uniformly, and greatly increasing its oxidizing capacity.

To these ends, therefore, our improvement consists in a steam-boiler inserted around the rotary chamber, within the heated-air space inside the brick-work of the Atwood apparatus, of capacity to generate steam sufficient to operate the engine actuating the rotary

chamber, and constructed with a crown-sheet of the proper curvature to act as a reverberating surface above, to radiate the heat back upon the immediate top surface of the rotary chamber, for the greater oxidizing efficiency of the same.

For the better information of the public we will proceed to describe in detail the construction of our improvement.

Of the drawings, which illustrate our improvement applied to the ordinary Atwood retort, Figure 1 is a longitudinal sectional elevation on the line *c d* of Fig. 2, and Fig. 2 a transverse sectional elevation on the line *a b* of Fig. 1.

Similar letters of reference indicate corresponding parts in both the figures.

Q represents the brick-work of the retort-furnace; M, the fire-box; A, the revolving chamber; and N, the heated-air chamber within which A revolves; P P, flues for the final escape of the exhausted heat; S, the boiler which we insert; R, the dome in which that boiler terminates; T, a connection with the adjoining boiler when more than one retort is used; V V, the piers upon which the water-legs of the boiler rest; *ll*, the water-legs; and *m*, the crown-plate of the boiler.

In shape our boiler resembles somewhat that of a locomotive. It rests upon piers of brick located upon both sides of the fire-box, and, springing from these piers, arches completely over the revolving chamber, forming the long sides and the top of the heated-air chamber N, as shown in the drawings. The curvature of the crown-plate may be varied, and the water-legs extended down to the line of the grate-bars, or terminated at any point above them, at pleasure.

The boiler, thus constructed and arranged, utilizes the heat otherwise wasted, for in it is generated steam sufficient to operate an engine capable of imparting motion to the gearing which revolves the chamber, and by a single fire is effected that which under the present system requires two, thus economizing to a very material extent the cost of running the present apparatus.

The shape and construction of our improved furnaces, and the means of connecting

and disconnecting the boilers one with the other, are such as convenience may suggest.

Having thus described our invention, we claim and desire to secure by Letters Patent of the United States—

In an apparatus for oxidizing metals, the combination of the rotary chamber A and arch-shaped boiler S, the crown-sheet of

which acts as a reverberating surface to the chamber, and a furnace, substantially as and for the purpose specified.

GEORGE LEIB HARRISON, JR.  
MORTIMER C. WILSON.

Witnesses:

JOHN RODGERS,  
THOMAS S. HARRISON.