No. 52,090. PATENTED JAN. 16, 1866.

A. H. TAIT & J. W. AVIS.

APPARATUS FOR DESULPHURIZING ORES.

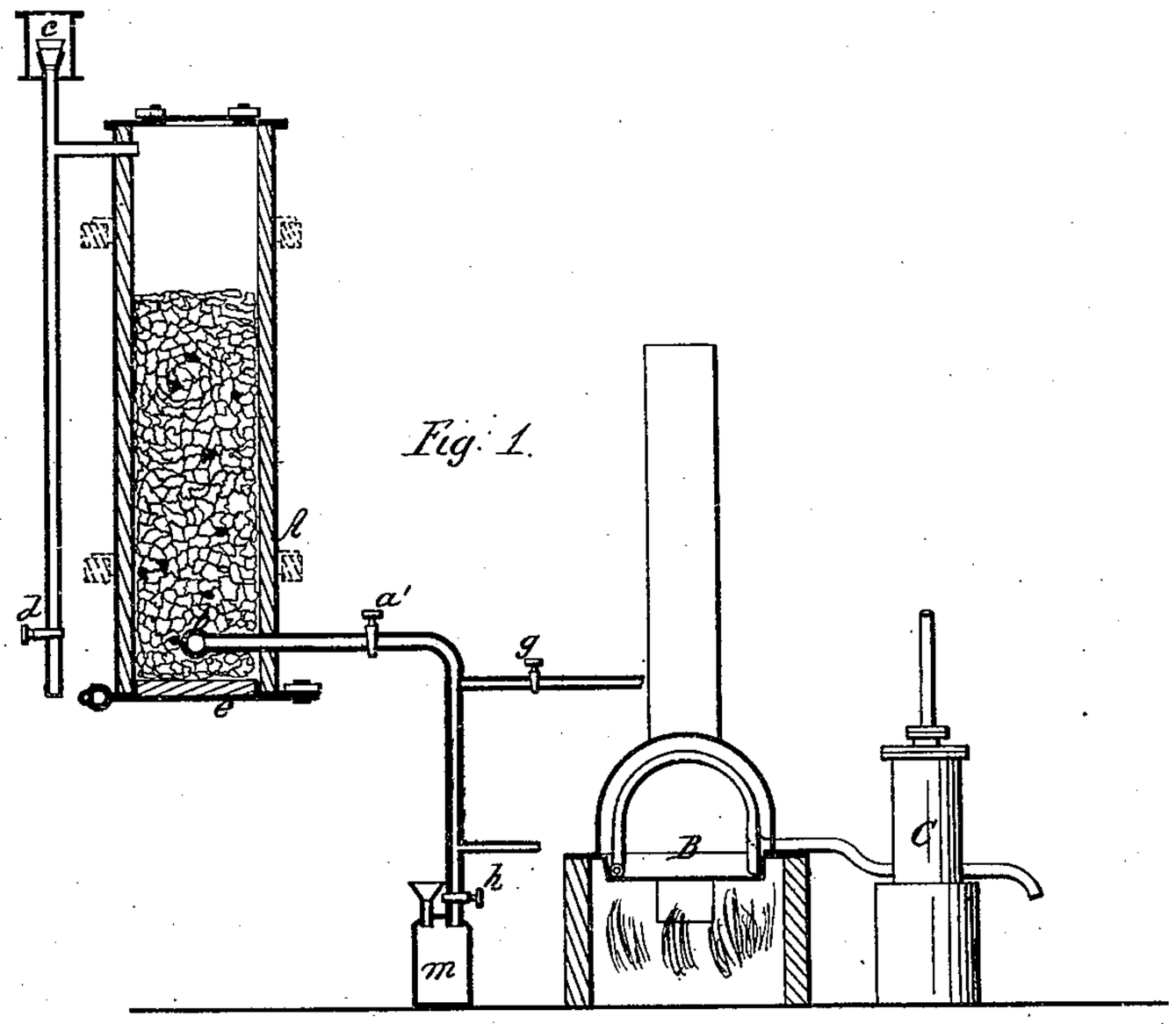

Fig. 1.

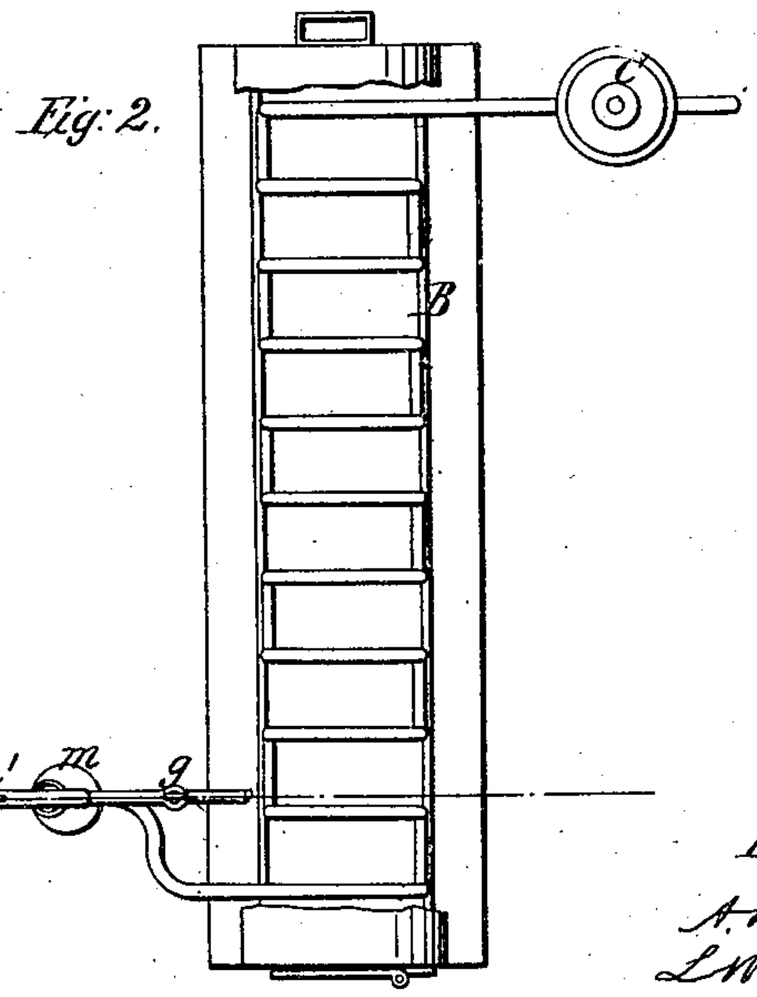

Fig. 2.

Witnesses;

Inventor;

A. H. Tait

J. W. Avis

By Munn & Co

UNITED STATES PATENT OFFICE.

AUGUSTUS H. TAIT AND JOSEPH W. AVIS, OF NEW YORK, N. Y.

IMPROVED APPARATUS FOR DESULPHURIZING ORES.

Specification forming part of Letters Patent No. **52,090**, dated January 16, 1866.

To all whom it may concern:

Be it known that we, AUGUSTUS H. TAIT and JOSEPH W. AVIS, both of 76 Broad street, in the city, county, and State of New York, have invented a new and useful Improvement in Desulphurizing Ores; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a longitudinal vertical section of the apparatus which we use in carrying out our invention. Fig. 2 is a plan or top view of the same.

Similar letters of reference indicate corresponding parts.

This invention consists in the use of a current of compressed atmospheric air heated to the proper temperature—say, about 600° Fahrenheit—by passing the same through pipes placed in a furnace, or by passing it through the fire itself in a closed box, said heated air being constantly maintained at a pressure of from twenty to forty pounds to the square inch, in combination with a closed box or receptacle containing the ore or sulphuret which have been reduced to fine powder, in such a manner that the air is compelled to pass through the entire mass of ore, and the oxygen contained in the air is allowed to act on the sulphur to the best possible advantage. In certain cases the process can be facilitated by the introduction of nitrous oxide in combination with the atmospheric air.

A represents the ore-furnace, made of sheet metal or any other suitable material, lined with brick and provided with a trap to put in the ore at the top, and another trap to let out the ore at the bottom. This furnace may be made about ten feet high, and loaded to the depth of six and a half feet with ore finely pulverized. Into this furnace a current of compressed heated air is driven by the action of an air-pump, C, the air being heated by passing it through the surcharge air-furnace B, either in a pipe, as shown, or so that the air passes directly through the fire. This pipe is provided with a stop-cock, *a'*, and with a suitable thermometer to indicate the temperature of the air, and when the furnace A has been loaded and the fire in the air-furnace lighted the cock *a'* is opened and the air, heated to from 500° to 600° Fahrenheit, is let into the ore-furnace through the aperture *b*. This furnace is provided with a valve, *c*, loaded to about twenty-five pounds to the square inch, and as soon as the pressure in the furnace reaches this point said valve opens at every stroke of the pump and allows the escape of the sulphurous acid and nitrogen generated in the furnace A by the decomposition of the heated air in its passage through the ore of pyrites in said furnace.

A trial-cock, *d*, is provided at the bottom end of the pipe which supports the valve *c*, and by opening this cock it is easy to ascertain when the sulphurets are decomposed by the absence of sulphurous acid, easily detected by its smell. When this state has been reached, the trap *e* is opened and the charge let down into a suitable receptacle.

In case of a certain description of refractory sulphurets we find the use of a small portion of steam, let in by a half-inch pipe through the cock *g*, and the admission of a small quantity of nitric oxide by means of the cock *h* from the retort *m*, of great advantage for the purpose of facilitating the union of the sulphur with atmospheric heated air.

In a complete apparatus two ore-cylinders are worked alternately or together.

We claim as new and desire to secure by Letters Patent—

1. The process herein described of desulphurizing sulphurets by a current of heated compressed atmospheric air impelled by a suitable pump, in combination with a closed furnace containing the ore, substantially as set forth.

2. The use in this process of nitric-oxide gas, in combination with the atmospheric air, as set forth.

3. The use of steam in combination with the heated air, as and for the purpose described.

A. H. TAIT.
JOSEPH W. AVIS.

Witnesses:
M. M. LIVINGSTON,
W. HAUFF.