J. MANES.

Revolving Ore-Roaster.

No. 209,821. Patented Nov. 12, 1878.

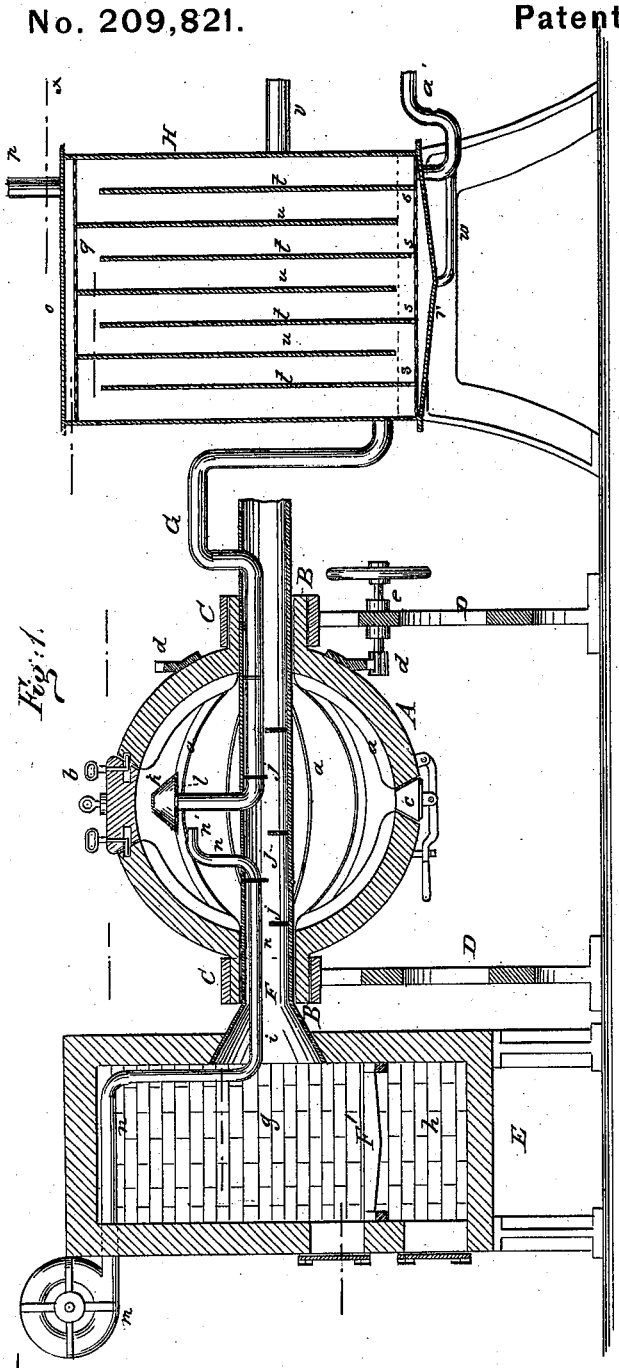

Fig. 1.

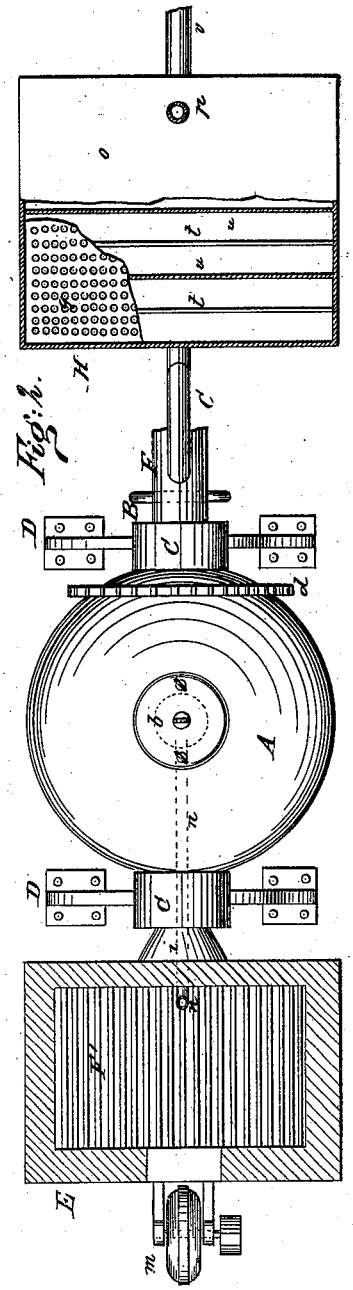

Fig. 2.

WITNESSES:

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UNITED STATES PATENT OFFICE.

JAMES MANES, OF NEW HAVEN, CONNECTICUT.

IMPROVEMENT IN REVOLVING ORE-ROASTERS.

Specification forming part of Letters Patent No. **209,821**, dated November 12, 1878; application filed February 2, 1878.

To all whom it may concern:

Be it known that I, JAMES MANES, of New Haven, in the county of New Haven and State of Connecticut, have invented a new and Improved Apparatus for Manufacturing Sulphuric Acid for Extracting Volatile Matters from Ores, &c., of which the following is a specification:

In the accompanying drawings, Figure 1 is a plan view, partly in section, of my improved apparatus. Fig. 2 is a longitudinal vertical section taken on line *x x* in Fig. 1.

My invention relates to an improved process and apparatus for manufacturing sulphuric and other acids, and for extracting volatile matters from ores and other substances.

The invention will first be described in connection with the drawings, and then pointed out in the claims.

Referring to the drawings, A is a globe or sphere, made of sheet-metal boiler-plates or of cast-iron or other suitable material, and lined in the interior with fire-brick or other refractory material. It is provided with hollow axles B, which are supported in journal-boxes C in the frame D. The globe is provided with several internal ribs, *a*, which extend from one of the axles to the other. It is also provided with a man-hole, *b*, and discharge-aperture *c*. A toothed circle, *d*, is secured to the globe A near one of its journals, and is engaged by the pinion *d* on the shaft *e*. A furnace, E, having the grate F′, fire-chamber *g*, and ash-pit *h*, is located near the globe A, and is provided with a flue, F, that leads through the globe A, entering at one of the hollow axles and projecting through the other. The flue has a conical or flaring mouth, *i*, and is provided with a number of deflectors, *j*, which are attached in alternation to opposite sides of the flue, and cause the products of combustion to take a zigzag course through the flue, the object being to economize heat as much as possible. The flue F leads to the chimney, and a natural or forced draft may be employed to create heat of the required intensity. A pipe, G, enters the flue F and runs to the center of the globe A, where it extends upward at right angles through the upper side of the flue F, and is provided with a hollow conical top, *k*, having an apertured base, *l*. A blower, M, is located at the top of the furnace E, and communicates by a pipe, *n*, with the interior of the globe A, the said pipe extending through the fire-chamber *g* and through flue F, and having a discharge-nozzle, *n′*, which directs the air-jet in a horizontal direction under the conical head *k*.

The pipe G leads from the globe to the condensing-chamber H, for conveying thither the volatile and finely-divided matter forced from the globe by means of the blast from the blower. The chamber H is provided with top *o*, into which a water-supply pipe, *p*, is introduced. A short distance below the top *o* there is a perforated horizontal diaphragm, *q*. The chamber is provided with a conical or hopper-shaped floor, *r*, above which there is a plane perforated diaphragm, *s*. Partitions *tu*, which are a little shorter than the interior height of the chamber, are attached in alternation to the diaphragms *s q*. The chamber is provided with a gas-discharge, *v*, which leads to condensing-chambers of ordinary construction. The lower portion of the floor *r* is provided with a water-discharge pipe, *w*, which communicates with an inverted siphon, *a′*, that leads away from the perforated diaphragm *s*.

The material to be treated is introduced into the globe A through the man-hole *b*, and, a fire being built in the furnace, the flue F becomes highly heated, and as the globe A is slowly rotated the material under treatment is carried up by the ribs *a* and dropped onto the heated flue. As the process progresses air is forced by the blower *m* through the pipe *n* into the globe A. The air, in its passage through the pipe *n*, becomes heated to a high temperature, and is in condition to unite with the highly-heated material contained by the globe. The oxidation of ores and metals is in this manner easily effected.

The fumes resulting from the roasting and oxidizing of the substance contained by the globe are driven through the conical head of the pipe G and conveyed to the chamber H, when, in passing up and down through space between the partitions, they are subjected to the action of the water supplied through the pipe *p*, and distributed by the perforated diaphragm *q*, so as to fall in a fine shower through the chamber. By this means all of

the solid particles of matter are carried to the bottom of the chamber, while the gas is permitted to escape through the pipe *v* to the condensing-chamber, and the waste-water is conveyed away through the pipe *a'*.

In the manufacture of sulphuric acid from pyrites the sulphurous acid is driven off by the heat, and the oxygen is supplied by the hot air blown into the globe.

This improved apparatus may be employed in the manufacture of sulphuric and other acids. It may be employed in the manufacture of white or red lead, carbonic acid or the fumes of acetic or other carbonating or oxidizing agent being forced into the globe which is charged with the metallic lead.

By means of this improvement all volatile metals, such as mercury, arsenic, bismuth, antimony, zinc, &c., may be extracted from their ores and condensed.

The apparatus may also be employed for calcining various substances, and for the manufacture of animal-charcoal, air being excluded.

It may also be used in the manufacture of gas by placing in the globe the coal or other substance from which the gas is made, and blowing steam or air, or a combination of both steam and air, into the globe through the nozzle *n'*.

It is obvious that for the different materials to be treated the apparatus must be somewhat modified. Therefore I do not confine myself to the use of any special materials in the construction of the apparatus, nor to the exact form and arrangement of parts herein described.

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

1. The combination, with the roasting-globe A, of the stationary furnace-flue F, extending entirely through said globe to the chimney, as and for the purpose described.

2. The combination, with the flue F, of the blower-pipe *n n'* and the condenser-pipe G, having hollow conical top *k*, as and for the purpose set forth.

3. The condensing and washing chamber H, containing perforated diaphragms *q s* and the partitions *t u*, substantially as and for the purpose specified.

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Witnesses:
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