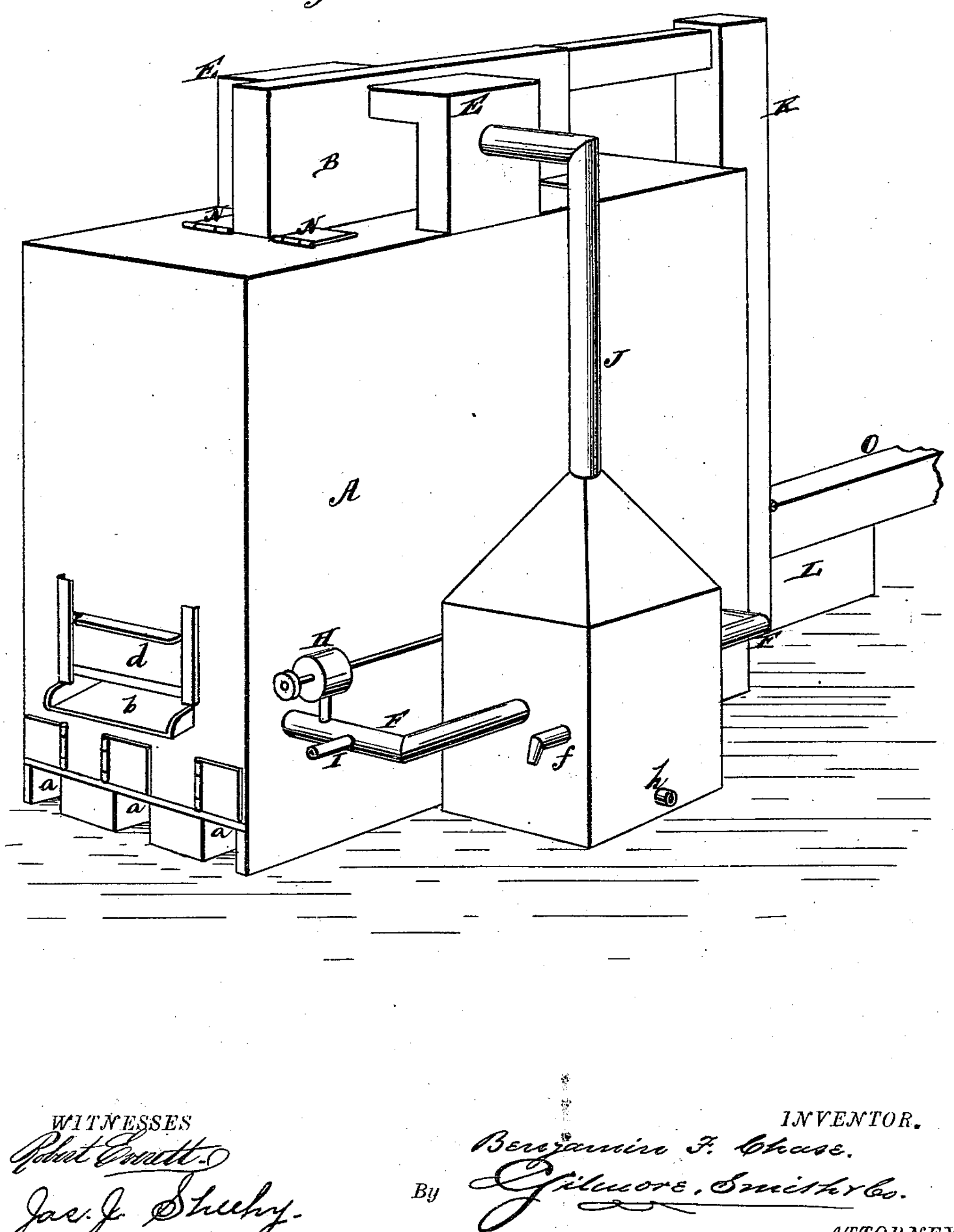
2 Sheets—Sheet 1.

B. F. CHASE.

Quicksilver Furnace and Condenser.

No. 212,189. **Patented Feb. 11, 1879.**

Fig. 1.



WITNESSES
Robert Everett.
Jas. J. Sheehy.

INVENTOR.
Benjamin F. Chase.
By Gilmore, Smith & Co.
ATTORNEYS.

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

2 Sheets—Sheet 2.

B. F. CHASE.

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Fig. 2.

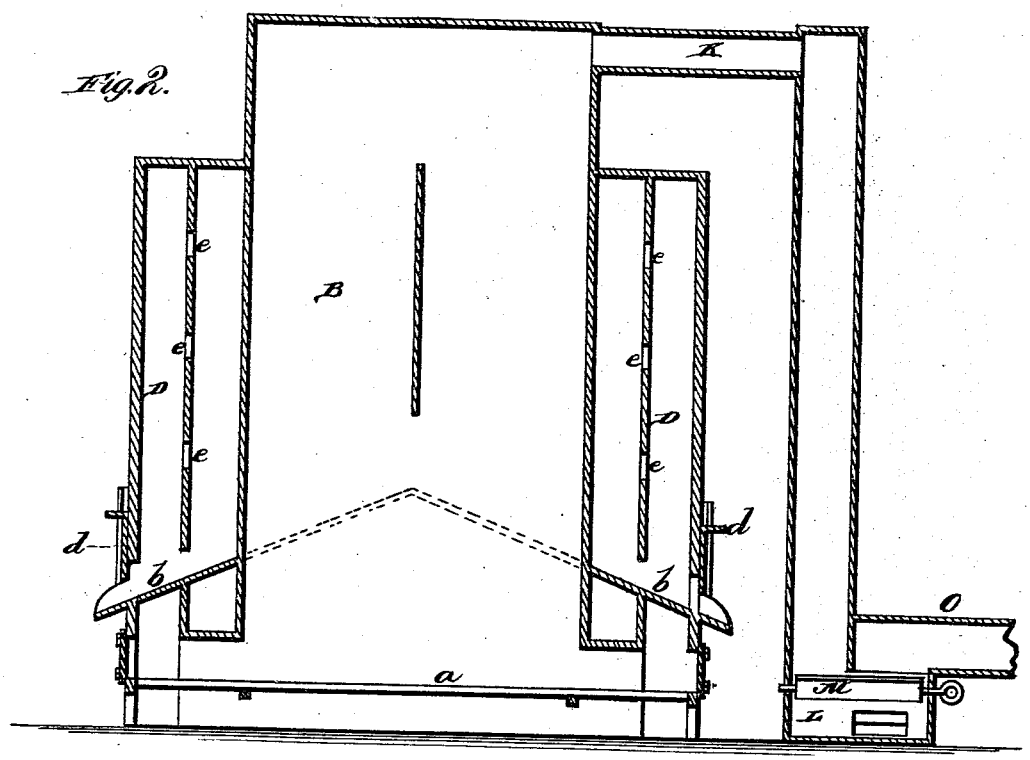
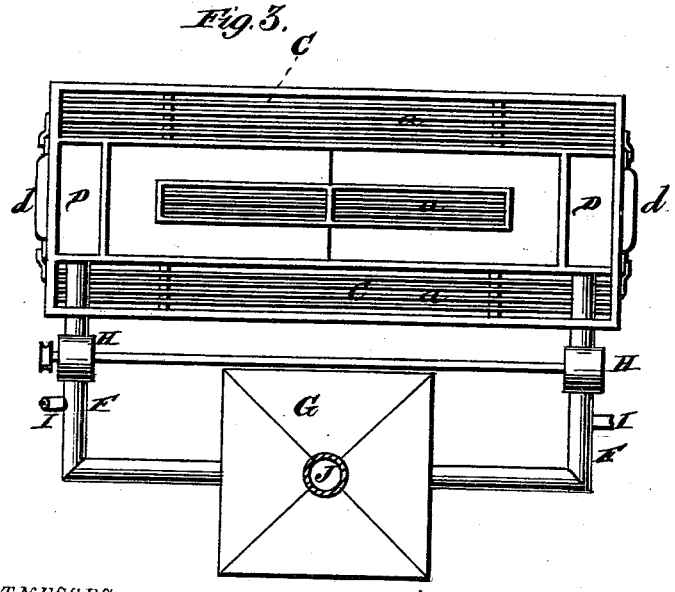


Fig. 3.



WITNESSES

Robt Everett

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By Gilmore, Smith & Co.

ATTORNEYS.

UNITED STATES PATENT OFFICE.

BENJAMIN F. CHASE, OF SAN JOSÉ, CALIFORNIA, ASSIGNOR OF ONE-HALF HIS RIGHT TO MOSES DAVIS, OF SAME PLACE.

IMPROVEMENT IN QUICKSILVER FURNACES AND CONDENSERS.

Specification forming part of Letters Patent No. **212,189**, dated February 11, 1879; application filed July 20, 1878.

To all whom it may concern:

Be it known that I, BENJAMIN F. CHASE, of San José, in the county of Santa Clara and State of California, have invented a new and valuable Improvement in Retorts and Condensers for Extracting Quicksilver from Cinnabar and other Metals; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a perspective of my retort and condenser. Fig. 2 is a longitudinal central sectional view of the same. Fig. 3 is a bottom-plan view.

My invention consists in apparatus for extracting quicksilver from cinnabar and other ores by evaporation through the agency of hot air obtained by hot-flues having non-perforated walls, one of said flues passing through the center of the retort and the others upon the outside, said flues being connected by suitable pipes provided with water-inlet pipes and fans, which operate upon the vapors to aid in cooling and condensing them in their transit to the condenser; also, a downward flue having a condenser, in combination with the central flue and main condenser, for condensing the steam, smoke, &c., that may escape from the main condenser and the central flue, all of which will be hereinafter fully described, and particularly pointed out in the claims.

The annexed drawings, to which reference is made, fully illustrate my invention.

A represents the upright retort, provided with a central flue, B, extending a suitable distance above the same. At each end of the retort is a vapor-chamber, D, and along each side is an outside flue, C, extending on the sides of the vapor-chambers D D, as shown. The outside flues, C C, are connected by pipes E E with the top of the center flue, B. Under the flues B and C C are furnaces *a*, as shown.

The retort A contains the cinnabar ore, and the intense heat obtained through the agency of the three flues gives any degree of heat or fire surface that may be desired. Quicksilver only requires 139° of heat to volatilize it; but the more heat is obtained the more cinnabar can be put through in a given length of time; and by the construction described I obtain all the heat needed by means of the increased amount of fire-surface.

At the lower end of each vapor-chamber D is a door, *d*, over a chute, *b*, leading through it from the retort, through which the cinnabar is taken after it has been properly heated to vaporize its contents.

The bottom of the retort is inclined from the center downward toward the doors *d d*, and the vapor passes from the retort through apertures *e e* into the vapor-chambers D D. There are no perforations in the walls between the flues and the retort. From each of these chambers the vapor passes through pipes F into the condenser G, said pipes being arranged to give the vapor a direct and natural draft to enter the condenser.

The pipes F F are connected with fans H H, and below said fans are water-inlet pipes I I, for sprays of cold water to enter the pipes F. The hot mercury vapor first comes in contact with the cold air from the fans, and then in the same pipe the hot vapor comes in direct contact with the spray of water which enters at I. The condenser will always have water in it up to the waste-pipe *f*.

h is the outlet from which the mercury is drawn into iron tanks for market.

The steam which is produced by the hot vapor is conveyed by a pipe, J, from the condenser G to one of the side flues, C, or its connection with the center flue.

If, by bad management, any of the vapor should pass out with the steam into the center flue, B, it is then carried out with the smoke through a flue, K, extending from the center flue, B, downward for a suitable distance, and the vapor condenses in a condenser, L, at the bottom of said flue K. In the condenser L is a valve, M, which is open always, except when the condenser L is being cleaned out.

The upper end of the flue K is to be provided with a perforated water-pipe, to shower the vapor with cold water, thus condensing the smoke and any mercury vapor that may

by bad management pass in that direction, and such is then saved in the condenser L. The water is to pass off through a suitable waste-pipe, and the quicksilver and soot are taken out by closing the valve M, without exposing the operator to the poisonous fumes.

On top of the retort are doors N, through which the cinnabar is fed into the retort.

From the fact that the vapor is drawn from the ends of the retort to the vapor-chamber D, and thence conveyed to the condenser G, the poisonous vapor cannot go up to escape and be lost, and cannot affect the operator at the doors N; nor can it go down to the doors *d*, where the cinnabar is drawn out, for there is a constant strong draft to the center or inside vapor-ports, and the vapor is drawn to the condenser G.

The flue K is provided with a conductor, O, to convey the poisonous smoke and sulphurous vapor under ground a suitable distance from the works, and then run up as high as may be required to carry off the poisonous vapor. The flue K should be of such height as to condense the smoke and any mercury vapor that may by chance go in this direction, and deposit it in the condenser L, where it is saved.

This structure may be built of common brick, fire-brick, stone, or any other suitable material, and of any desired dimensions.

I am aware that it is common to distill or retort mercury from its ores in apparatus in which the walls of the furnaces proper are not perforated, so that the products of combustion do not come in contact with the mercurial vapors. I do not, therefore, broadly claim such apparatus.

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

1. In a retort and condenser for extracting quicksilver from cinnabar and other ores, the combination of the central flue, B, having non-perforated walls, with the non-perforated side flues, C and E, vapor-chambers D, pipes F, fans H, and condenser G, substantially as and for the purposes set forth.

2. The retort A, constructed, as described, with center flue, B, outside flues, C C, vapor-chambers D D, and pipes F F, having water-inlet pipes I I and fans H, and in combination with the condenser G, substantially as and for the purpose herein set forth.

3. The downward flue K, with condenser L, in combination with the flue B and condenser G, with connecting-pipe J, substantially as and for the purpose set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

BENJAMIN FRANKLIN CHASE.

Witnesses:
J. E. BROWN,
J. W. STEPHENSON.