

W. McCALL.
ORE-ROASTING FURNACE.

No. 170,095.

Patented Nov. 16, 1875.

Fig. 1.

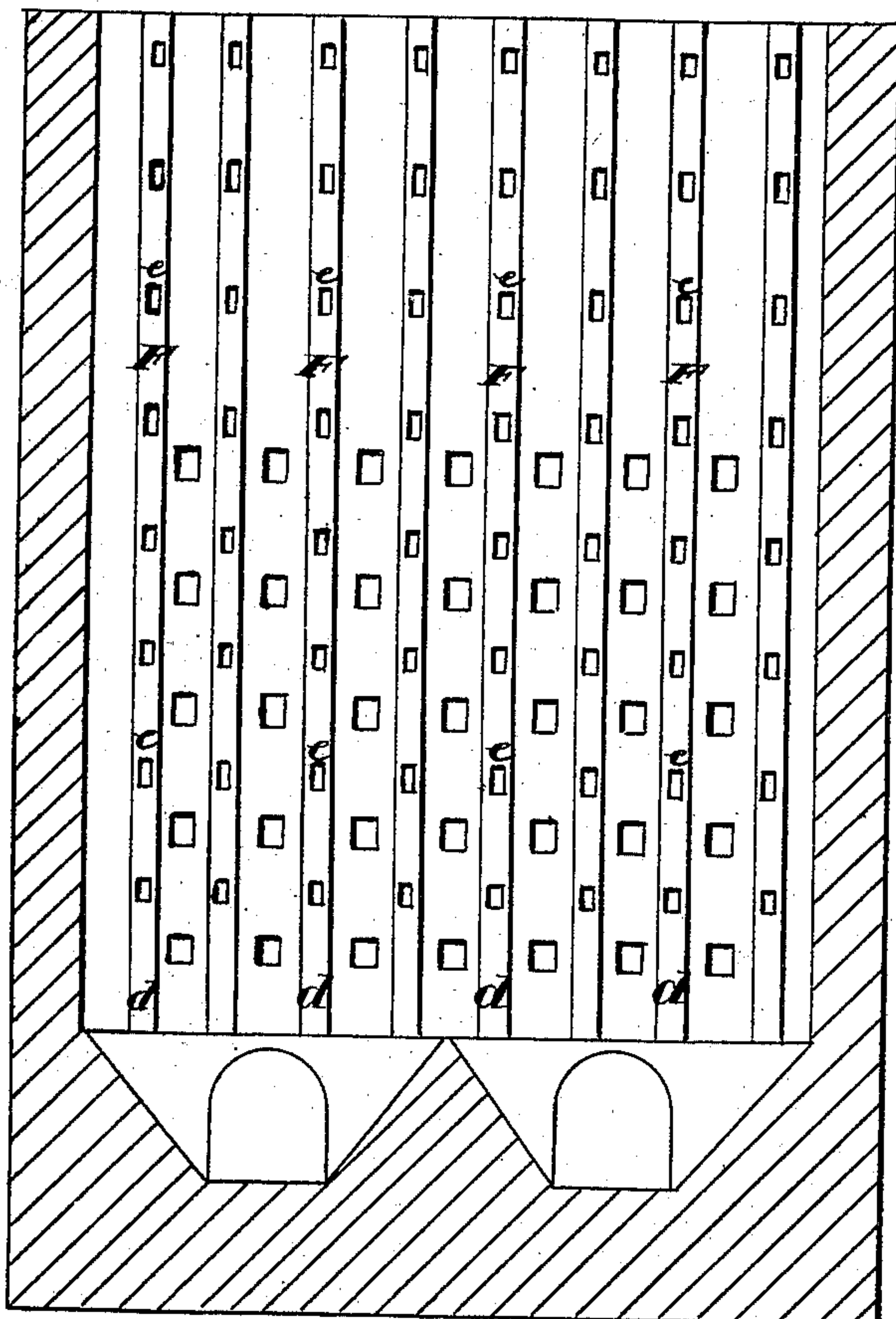


Fig. 2.

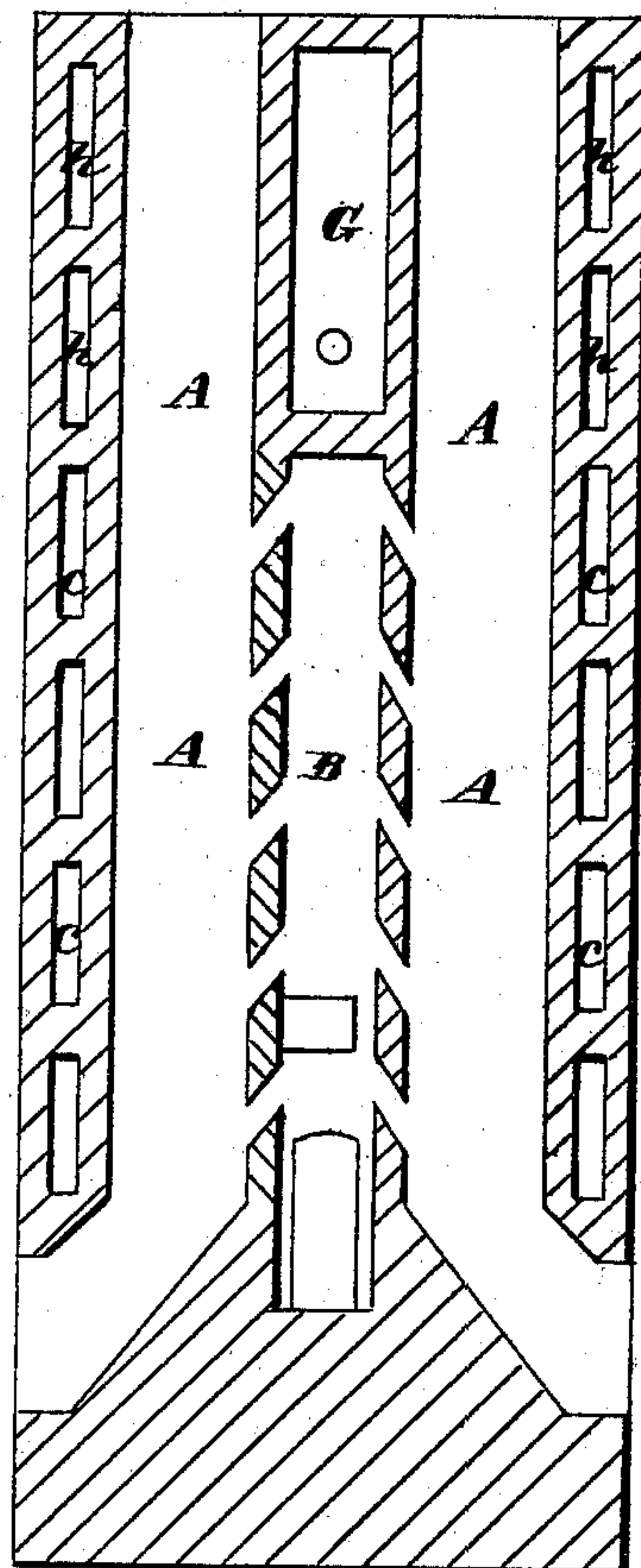
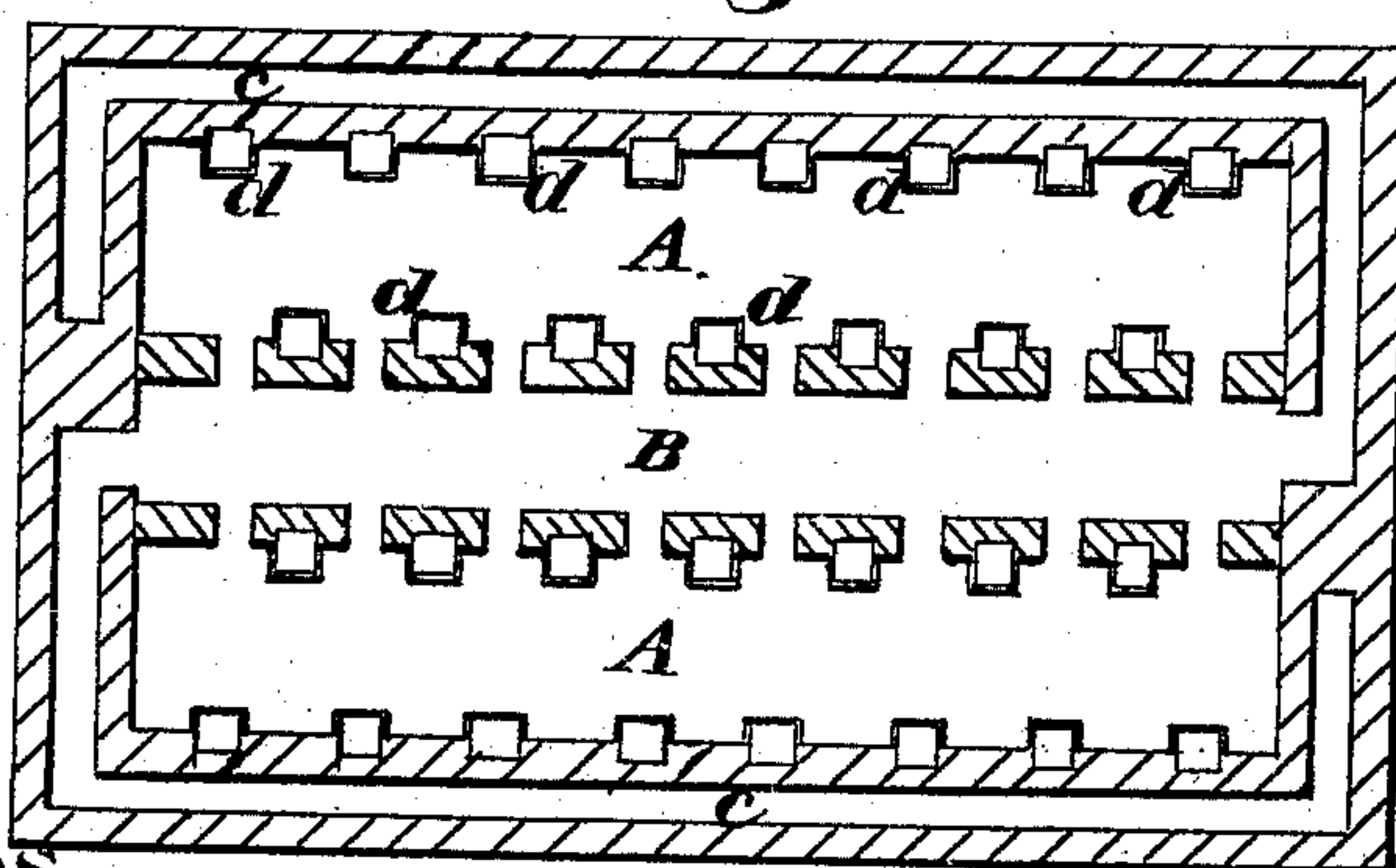


Fig. 3.



Witnesses

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Fig. 3.

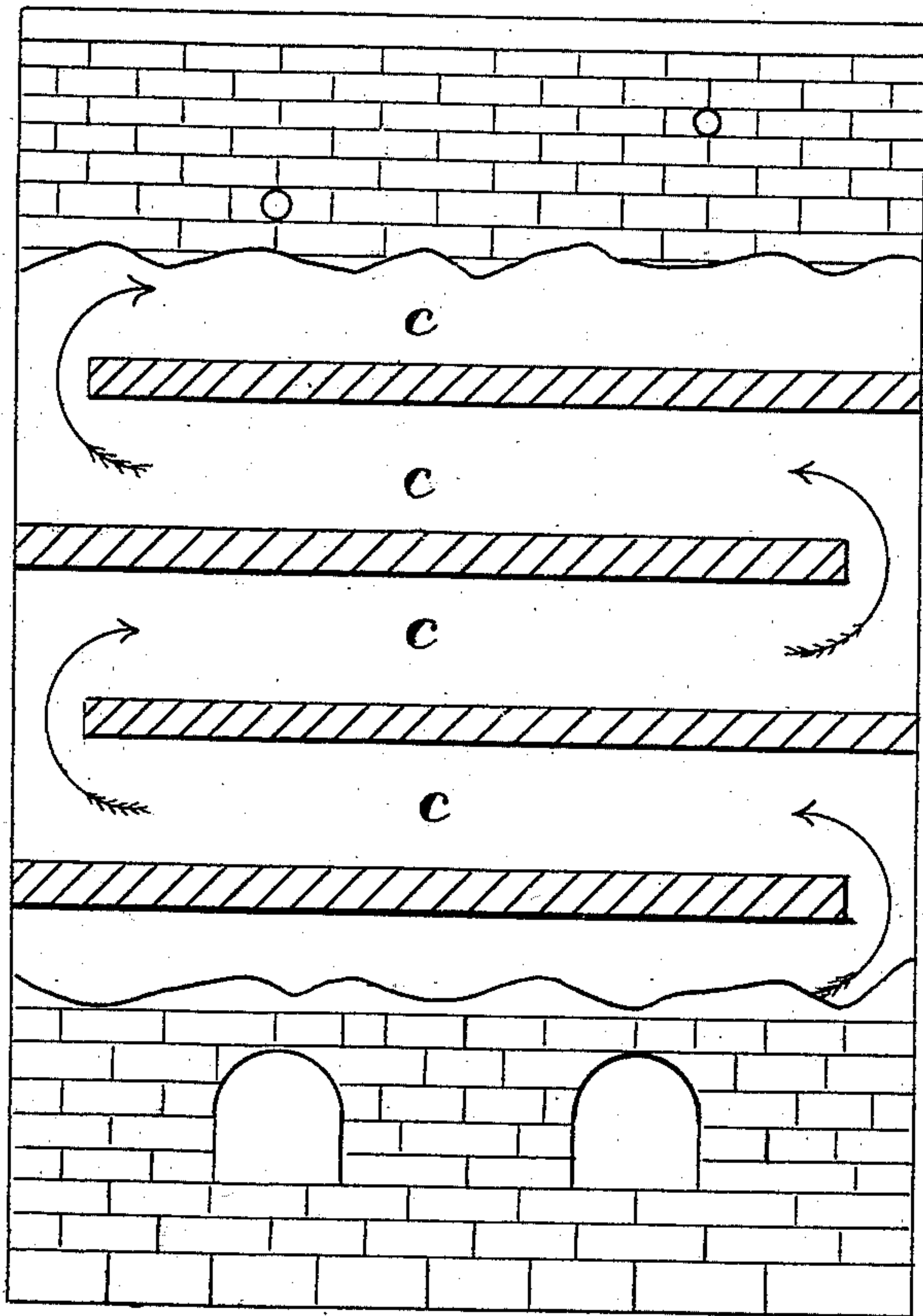
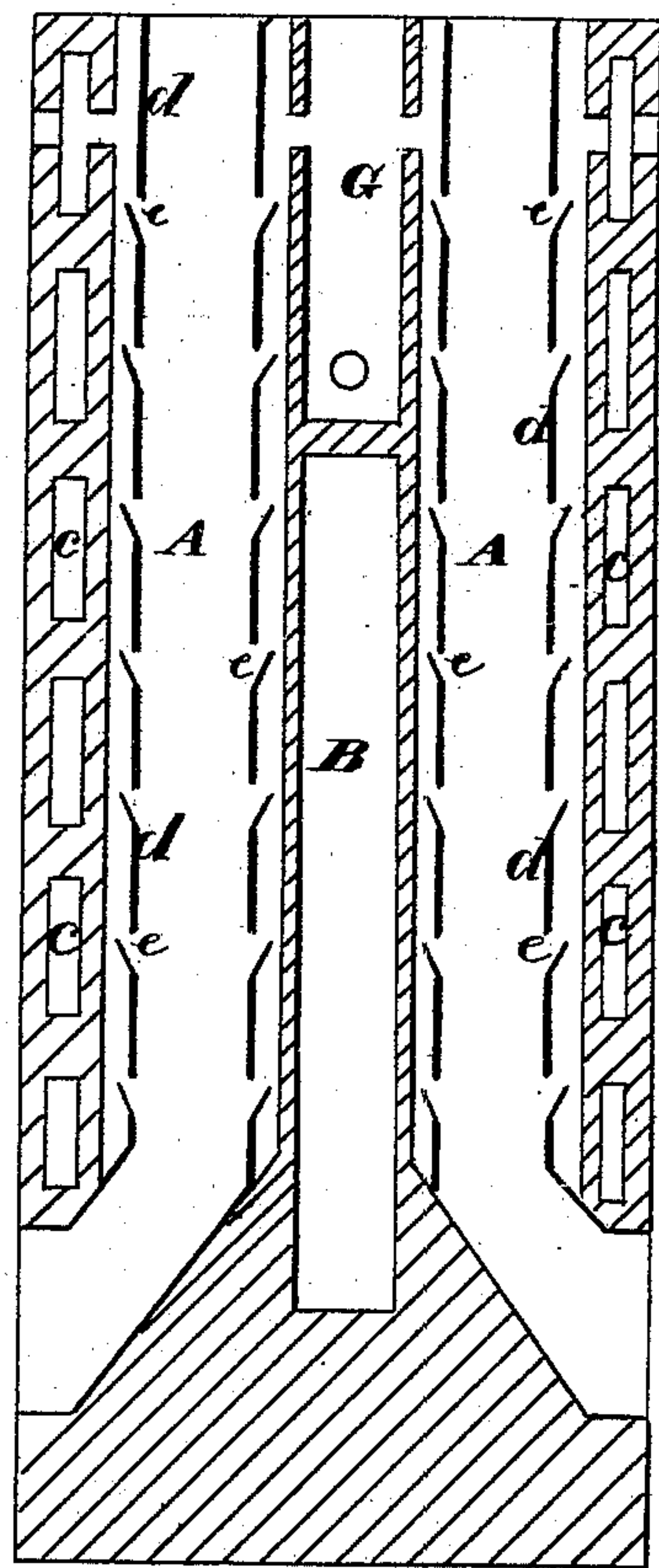


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM McCALL, OF SAN FRANCISCO, CALIFORNIA.

IMPROVEMENT IN ORE-ROASTING FURNACES.

Specification forming part of Letters Patent No. **170,095**, dated November 16, 1875; application filed July 13, 1875.

To all whom it may concern:

Be it known that I, WILLIAM McCALL, of San Francisco city and county, State of California, have invented an Improved Furnace for Roasting Fine Ores; and I do hereby declare the following description and accompanying drawings are sufficient to enable any person skilled in the art or science to which it most nearly appertains to make and use my said invention or improvement without further invention or experiment.

My invention relates to a novel furnace for roasting fine ores of mercury or other substances; and it consists in the employment of narrow ore-chambers on opposite sides of a central furnace or heating-chamber, and which are in turn surrounded on three sides by peculiarly-arranged heating-flues from this central furnace for the purpose of heating the ore upon all sides. The ore-chambers are provided with vertical channels within their walls, so that the fumes arising from the ore can be conveyed away. Inclined passages or shutters open upwardly into these channels and prevent the ore from entering, while they allow a free passage of the vapors.

Referring to the accompanying drawing for a more complete explanation of my invention, Figure 1, Sheet 1, is a longitudinal-vertical section of my furnace. Fig. 2 is a transverse vertical section. Fig. 3, Sheet 2, is a section showing flues. Fig. 4, Sheet 2, is a section showing fume-flues.

In the roasting of ores in chambers, it is usual, with coarse rock, to pass the products of combustion directly through or across the body of ore, and convey the resulting fumes (if the ore be quicksilver) to the condensing-chambers. This method will serve as long as coarse rock is used, and there is no difficulty in freely drawing off the fumes, and also in thoroughly exposing the whole mass to the influence of the heat, because the interstices in the mass are sufficiently large to allow a good draft.

In the roasting of the so-called "tierras" or quicksilver-bearing earths, and the finely-pulverized rock, of which much is produced in mining, great difficulty has heretofore been experienced, first, in thoroughly roasting the

mass, and, secondly, in withdrawing the fumes from the ore-chamber.

In order to accomplish these ends, I make my ore-chambers A A very narrow, and place one upon each side of a central heating-chamber, B.

The chamber may be made of any suitable length, and the furnace can be fired at either or both ends.

The outer walls of the furnace are built up to a suitable height, and are of considerable thickness. Within these walls I form flues C, which, connecting with the heating-chamber near the bottom, are carried across the ends, and thence along the sides, where they pass from end to end alternately, as shown. One of these passages or flues leads from one end of the heating-chamber, and the other from the opposite, and each flue leads to the opposite side of the furnace, so that the body of ore in the chamber A will be entirely surrounded by the heat. The outer walls may be about sixteen inches thick, and the walls between the fire-space and the ore-chamber about nine inches. The flues C rise in their zigzag course to near the top of the furnace upon each side, and there connect through the outer walls with chimneys. The ore-chambers have inclines at the bottom, and these inclines carry the ore to the exit-opening, so that, being fed in at the top, it will work slowly down, and finally be removed from these exits, making a continuous working.

Another great difficulty which has heretofore existed in attempting to roast these fine ores or tierras has been in removing the vapors, and this difficulty I overcome by making the ore-chambers very narrow, and providing them with numerous passages or vertical channels *d d*, at the sides. These passages are numerous and large enough to receive the uprising vapors from all parts of the mass, and have openings provided for this purpose, while at the same time they keep the ore from passing into and filling up the channels by their peculiar shutter-like construction.

I prefer to build the channels *d* within the walls, so that when completed the whole interior of the ore-chamber will be free from obstruction. The walls or faces F of the chan-

nels which lie next to the ore-chamber, are perforated by numerous inclined openings *e e*, as shown, these openings resembling in their form window blinds or shutters.

Similarly-shaped openings are made from the collecting-chamber *G* in the ore-chambers, and by this construction I not only freely carry off the fumes, but the passage of the fine ore past these openings will loosen it up somewhat, so as to give greater freedom for the escape of vapors. The upper part of the walls of the furnace contains flues *h*, and these and the space *G* above the heating-chamber are connected so as to receive the fumes and convey them to the exit-openings, from which they pass to the condenser.

By this construction of a series of narrow ore-chambers, entirely surrounded by heating-flues, and the system of shutter-like fume-passages and vertical channels, I am enabled to successively roast fine mercurial ores and earths, and economize fuel.

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

1. The series of narrow ore-chambers *A A*, in combination with the central heating-chambers *B*, and the surrounding flues *C* returning upon themselves in the walls of the furnace, as shown, so as to surround the ore-chambers, substantially as herein described.

2. In combination with the narrow chambers *A*, central heating-chambers *B*, and surrounding flues *C*, the vertical frame passages *d d*, with their inclined shutter-like openings *e e*, and the collecting-chamber *G*, substantially as and for the purpose herein described.

WILLIAM McCALL.

Witnesses:

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