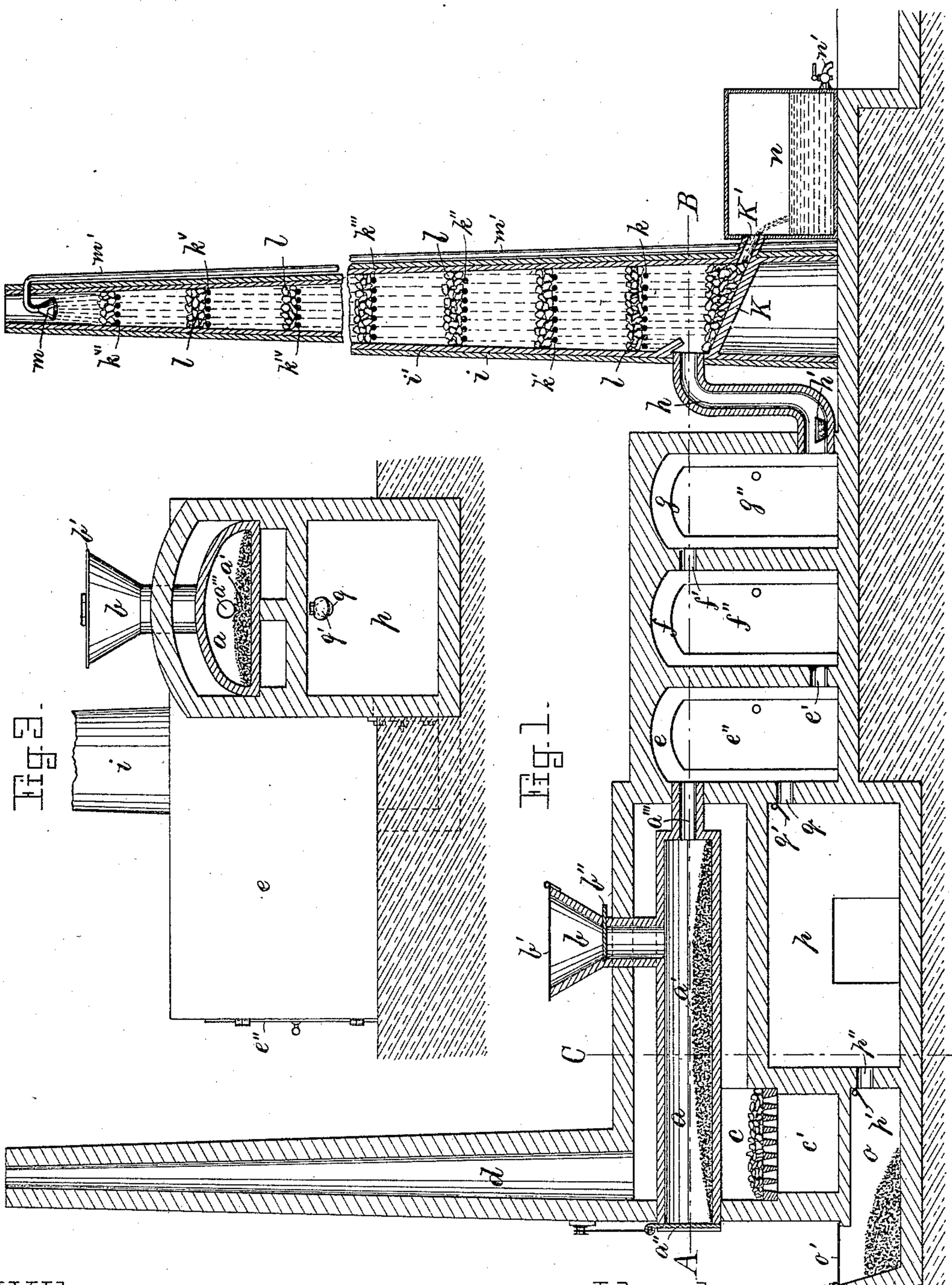
(No Model.) 2 Sheets—Sheet 1.

A. HUDSON.

ANTIMONY FURNACE.

No. 286,200. Patented Oct. 9, 1883.



Witnesses
Henry Chadbourn.
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(No Model.) 2 Sheets—Sheet 2.

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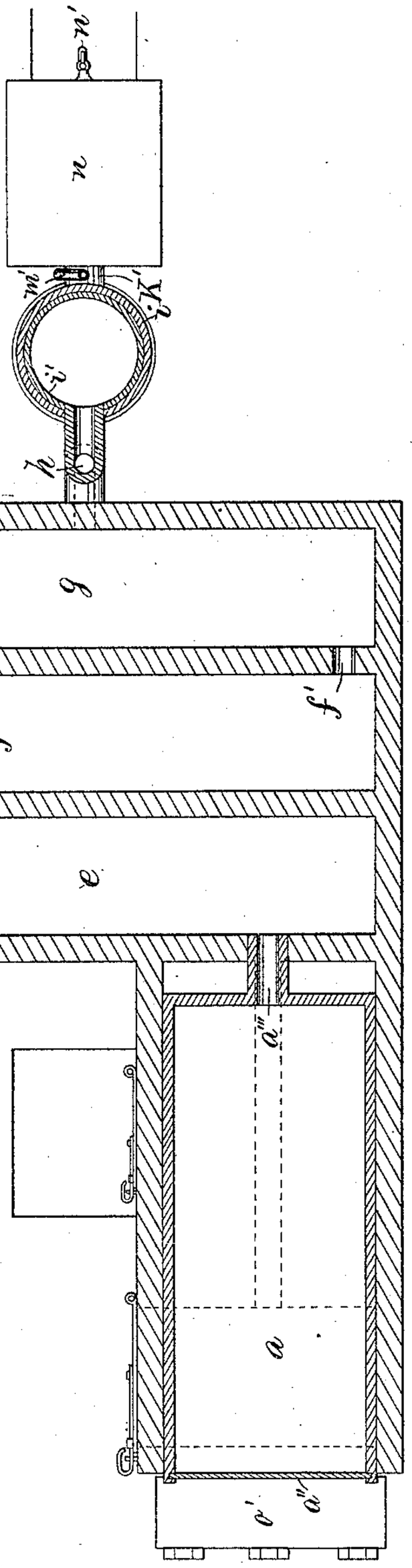
Fig. 2.



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UNITED STATES PATENT OFFICE.

ARTHUR HUDSON, OF NEWTON, MASSACHUSETTS.

ANTIMONY-FURNACE.

SPECIFICATION forming part of Letters Patent No. 286,200, dated October 9, 1883.

Application filed January 2, 1883. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR HUDSON, a citizen of the United States, residing at Newton, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Antimony-Furnaces; and I do hereby declare that the same are fully described in the following specification and illustrated in the accompanying drawings.

This invention relates to improvements in antimony-furnaces for producing the regulus of antimony from its native metals with the least amount of loss of volatile oxides of antimony and sulphur, and it is carried out as follows, reference being had to the accompanying drawings, where—

Figure 1 represents a longitudinal section of my improved antimony-furnace. Fig. 2 represents a horizontal section on the line A B; and Fig. 3 represents a cross-section on the line C D, shown in Fig. 1.

Similar letters refer to similar parts wherever they occur on the different parts of the drawings.

a' represents the ore, which, after being crushed, as usual, or its tersulphuret previously separated from its gangue or mineral matters, is introduced through the hopper *b* into the muffle *a*, where it is roasted by the heat from the furnace *c*, the products of which, after passing around the rear end of the muffle *a*, ascend through the chimney *d* in the ordinary way. The hopper *b* has a cover, *b'*, at its upper end, and a movable gate or valve, *b''*, as shown in Fig. 1, which is closed after the muffle is charged, to prevent the gaseous products from the muffle from escaping through said hopper. The front of the muffle *a* has a removable door or gate, *a''*, by which the supply of air is regulated to combine with the ore during the process of producing the oxide of antimony, and is adapted to be fully opened when desired to discharge the muffle of its residue, or in rabbling the contents. At the rear of the muffle *a* is an opening, *a'''*, which leads into the first condensing-chamber, *e*, which has an opening or channel, *e'*, leading into a similar second condensing-chamber, *f*, having an opening or channel, *f'*, leading to the third condensing-chamber, *g*, as shown. Said condensing-chambers are made of brickwork or suitable masonry, and are each provided with suitable doors, *e''*, *f''*, and *g''*, as shown. From the last condensing-chamber, *g*, in the series is a flue, *h*, leading to the chimney *i*, which latter has an internal lead lining, *i'*, as shown in Fig. 1. In the flue *h* is located a pot, *h'*, containing niter.

Within the chimney *i* are arranged a number of shelves or grates, *k k' k''*, containing coke or pumice-stone *l l l*, which is kept wet by a descending shower or stream of cold water forced down through sieve *m*, located within and at the upper end of the chimney *i*, and connected to a suitable stand-pipe, *m'*, through which cold water is forced by means of a suitable pump or other equivalent means.

K is an inclined solid shelf near the lower end of the inside of the chimney *i*, from which the condensed products are conducted through channel K' to the receptacle *n*, as shown in Fig. 1.

The operation is as follows: The ore *a'*, after being crushed, as usual, or previously separated from its gangue or mineral matters, is placed in the muffle *a*, where it is roasted by the heat from the products of the furnace *c*, and by such roasting the ore is made to produce oxide of antimony, incidentally volatile oxide of artimony and sulphurous acid, which both pass together out from the muffle *a* into the condensing-chambers *e f g*, upon the inner walls of which the volatile oxide of antimony is deposited in the form of a powder, which is from time to time drawn out through the doors *e'' f''' g''*. The sulphurous acid passes on through the flue *h* and over the niter-pot *h'*, and by coming in contact with the niter contained in said receptacle *h'* it is converted into gaseous sulphuric acid, which ascends through the chimney or tower *i*, and through the coke or pumice-stone *l* contained on the shelves or grates *k k' k''* therein, and is condensed into the form of liquid sulphuric acid by the descending spray or stream of cold water from the sieve or pipe *m*, such liquid sulphuric acid being conducted through channel K' into the acid vat or receptacle *n*, from which it is drawn through the stop-cock *n'*. After the ore has been roasted sufficiently in the muffle *a* the door *a''* is opened and the contents of the muffle withdrawn and allowed to cool in the chamber *o*, which is located below the ash-pit *c'*, and is provided in front with a suitable cover,

o', which is swung open to allow the ore to drop directly into the chamber *o* when withdrawn from the muffle. The cover *o'* is then closed and the valve *p'* is opened to allow the remaining volatile oxide of antimony and sulphurous acid to pass through opening *p''* into condensing-chamber *p*, and thence through opening *q* into the series of condensing-chambers *e*, *f*, and *g*, in the same manner as above described in treating the ore originally. *q'* is a valve to close the opening *q* when the muffle *a* is in operation.

Heretofore antimony has been produced in reverberating-furnaces, and without any condensing-chambers or means for saving the volatile oxide of antimony and sulphurous acid, and consequently a great loss has been occasioned in the process, as well as deteriorating the atmosphere of the neighborhood of the works, destruction of vegetation, and injury to health of the operatives. With my improved method and apparatus these objections are overcome, as I am able to save and utilize nearly all of the volatile by-products, as well as preventing any deterioration of the atmosphere.

What I claim is—

The herein-described improved antimony-furnace, consisting of muffle *a*, furnace *c*, one or more condensing-chambers, *e f g*, nitrate-pot *h'*, the condensing-tower *i*, with its shelves or grates *k k' k''*, coke or pumice-stone *l*, and water pipe and sprinkler *m m'*, as and for the purpose set forth.

In testimony whereof I have affixed my signature in presence of two witnesses.

ARTHUR HUDSON.

Witnesses:

ALBAN ANDRÉN,

HENRY CHADBOURN.