

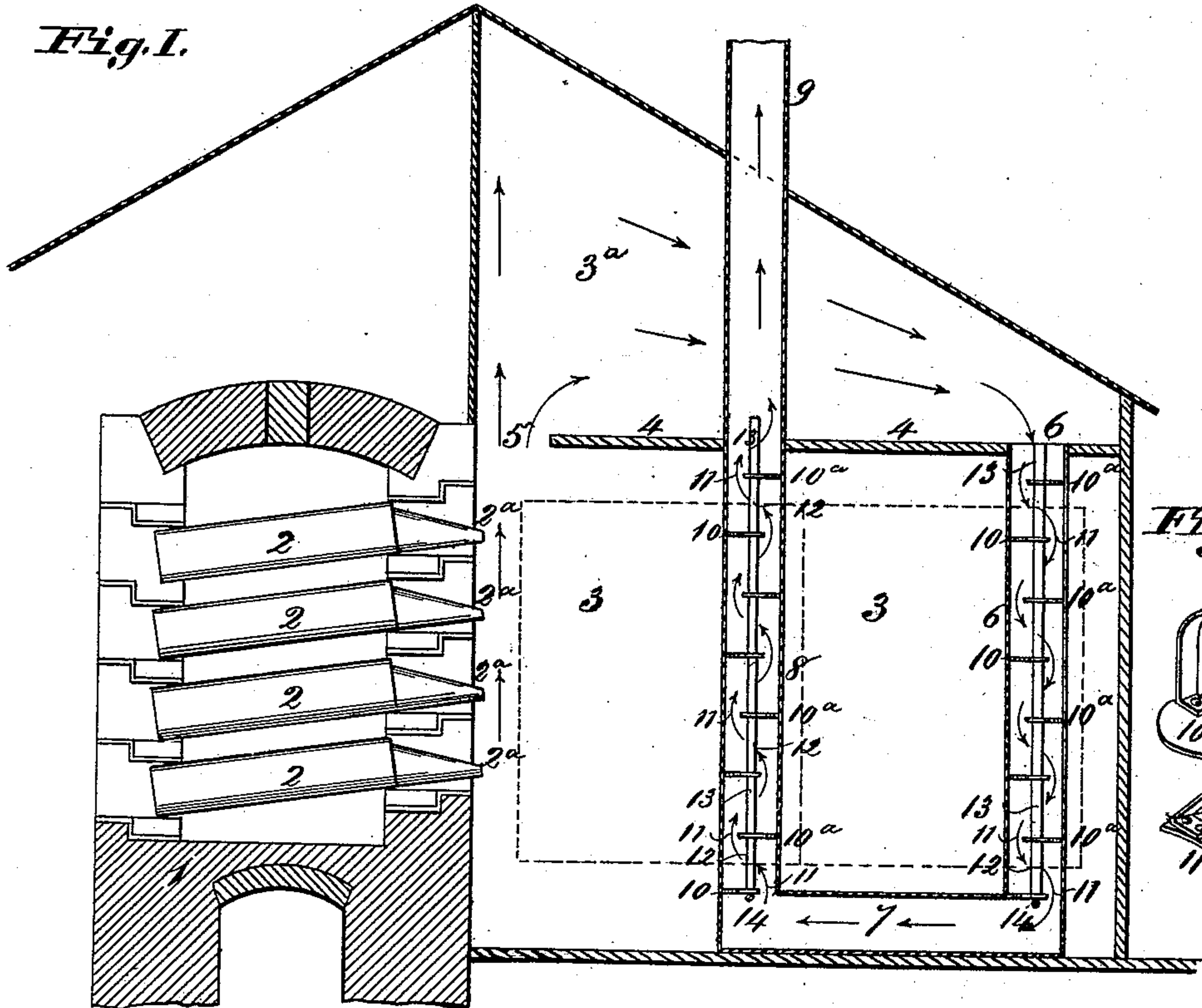
(No Model.)

O. LUMAGHI.  
ZINC FURNACE.

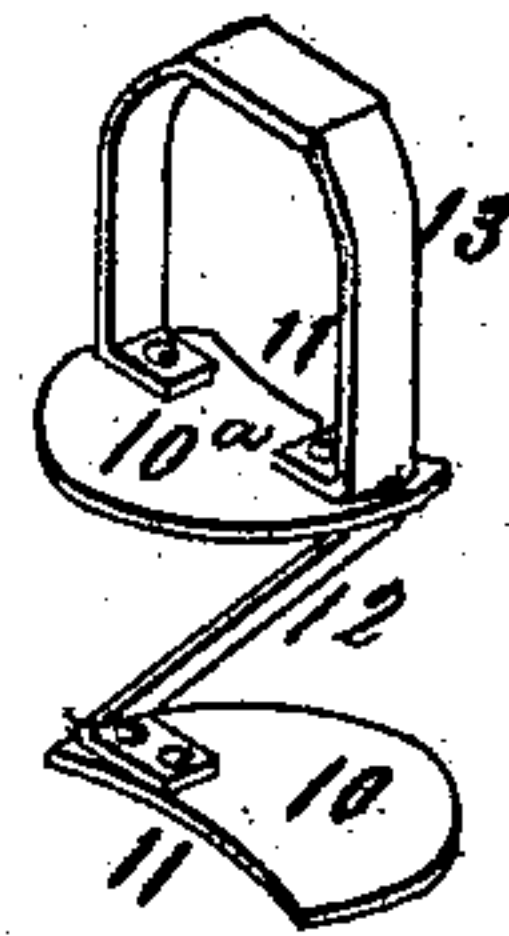
No. 483,934

Patented Oct. 4, 1892.

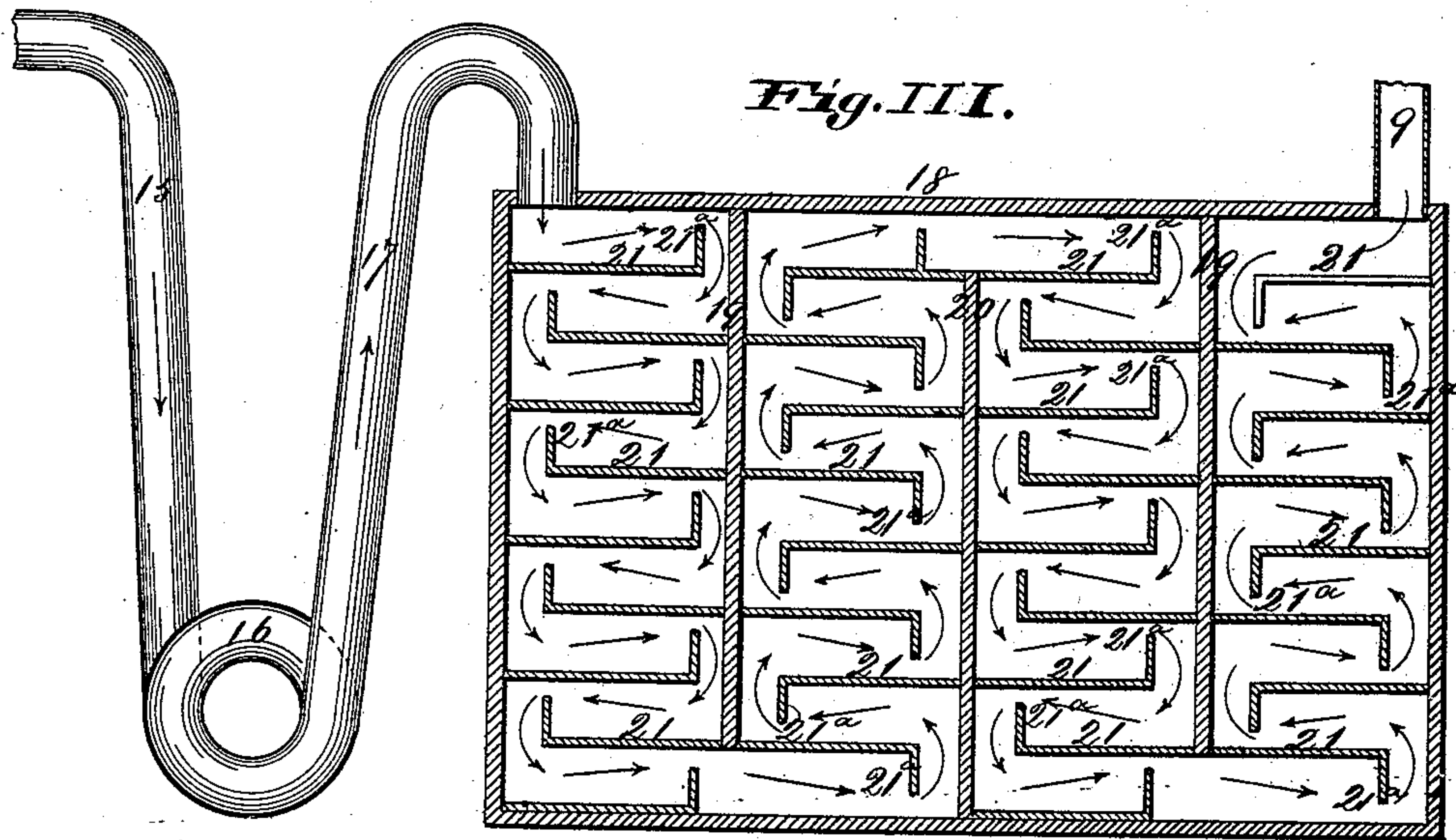
*Fig. I.*



*Fig. II.*



*Fig. III.*



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# UNITED STATES PATENT OFFICE.

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## ZINC-FURNACE.

SPECIFICATION forming part of Letters Patent No. 483,934, dated October 4, 1892.

Application filed November 10, 1891. Serial No. 411,462. (No model.)

*To all whom it may concern:*

Be it known that I, OCTAVIUS LUMAGHI, of the city of St. Louis, in the State of Missouri, have invented a certain new and useful Improvement in Zinc-Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification.

This is a substitute for the bags used for recovering the oxide from the fumes escaping from reducing furnaces or retorts, the object being to substitute a safe and easy way for collecting the fumes on shelves, and, if preferred, in dust-pans placed therein, so as to avoid all contact with the dust that is necessarily raised in collecting this material from bags, the oxides from these fumes being liable to contain lead and arsenic, so that the health of the operators is very seriously injured.

The invention consists of a furnace having a devious passage for the circulation of the fumes, intercepted by many deflectors and connected to an inclosure which receives the fumes from the retorts. The passage leads from the inclosure to the downtake-flue, then through the horizontal flue or flues into the lower end of the uptake-flue, and thence out the chimney. The uptake-flue being made of the best conductive material—such as sheet-iron—and being located as near as convenient to the front of the furnace, while the rest of the apparatus is made of less conductive material—such as lumber or brickwork—and located farther from the furnace, the heat radiated from the furnace is promptly transmitted to the heated air and fumes in the uptake-flue and their volume so increased that an ascensional force is set in motion to produce a natural circulation from the inclosure through the flues. The circulation is maintained without labor or expense as long as the furnace is in operation.

Figure I is a vertical elevation illustrating the improvement with natural draft produced by the retort-furnace. Fig. II is a perspective view of one of the deflectors used in the flues. Fig. III is a vertical section showing a modification of the improvement applied to a forced-draft apparatus.

The device shown in Figs. I and II will be first described.

1 is the furnace, having retorts 2. The furnace forms one wall or part of one wall of a fume-chamber 3, the mouths 2<sup>a</sup> of the retorts discharging the metallic fumes, &c., into the chamber. The chamber has a horizontal partition or floor 4, separating the lower part of the chamber from the upper part 3<sup>a</sup>.

5 is a passage-way leading from the lower part of the chamber to the upper part 3<sup>a</sup>.

6 is the downtake-flue, whose upper end is open to the upper part 3<sup>a</sup> of the chamber, so that the fumes descend from the upper chamber 3<sup>a</sup> down the downtake.

7 is the horizontal flue or receiving-box, connecting the lower end of the downtake-flue to the lower end of the uptake-flue 8, ending in a chimney 9. The uptake-flue is near to the furnace, while the downtake-flue is distant from the furnace, and thus the heat of the furnace produces the current in the flue. If the fumes were allowed to pass through the flues without any obstruction, the metal sublimate would be carried out through the chimney and so wasted without some other means were provided to recover it. In order to arrest the sublimate, I place deflectors in the flue. These may be of any suitable form and arrangement; but I have adopted deflectors whose construction will now be described.

10 is a plate adapted to fit the inside of the flue, except that one side is cut away at 11, leaving a passage through which the fumes pass.

10<sup>a</sup> is a plate formed like the plate 10 and connected therewith by a bar 12. Upon the plate 10<sup>a</sup> is a standing frame 13, adapted to support another deflector by the bearing of its lower plate 10 upon it. Thus the vertical flues may be filled or partly filled with the deflectors, as seen in Fig. I, each deflector composed of the two plates 10 and 10<sup>a</sup>, connected together by a bar 12 and having the standing frame 13. The deflectors are stood one upon another, the lower one being supported on a cross-bar 14, passed through the flue. More or less of these deflectors are used according to circumstances. If it is found that there is waste at the chimney, additional deflectors are put in the flue. By examination of Figs. I and II it will be seen that the position of the plates 10 and 10<sup>a</sup> are reversed, so that the aperture 11 comes on opposite sides



alternately, and thus the fumes have to take a devious track, impinging against each of the plates 10 and 10<sup>a</sup> as they pass through the flue. This will cause the metal oxides or  
 5 sublimate to adhere to the plates, from which it may be dislodged by concussion given to the flues at intervals and will fall into the receiver 7, from which it may be removed, as desired.

10 Any suitable doors or openings may be provided for removing the sublimate from the fume-chamber—such, for example, as indicated by dotted lines in Fig. I.

In the modification shown in Fig. III the  
 15 fumes are caused to pass through the depositing device or depositor by a forced or suction draft produced by a fan or other blower or suction device. (Not shown.) 15 is a pipe from the chamber, into which the retorts discharge.  
 20 This pipe is preferably carried down to a coil 16, having one or more turns, and connected at the discharge end with an ascending flue 17, having goose-neck connection with the interior of the depositing-chamber 18. The  
 25 depositing-chamber has vertical partitions 19 and 20, descending from the top and ascending from the bottom alternately. The descending partitions stop short of the bottom and the ascending partitions short of the top,  
 30 so that the fumes alternately descend and ascend in the chamber. In addition to the vertical partitions are horizontal deflectors 21, adapted to receive the impingement of the fume-current, and thus delay its progress and  
 35 cause the deposit of the sublimate or metal oxide upon the deflectors. The deflectors have a main horizontal part with a vertical flange 21<sup>a</sup>. Where the current is descending the flanges extend upward, and where the cur-  
 40 rent is ascending the flanges extend downward, so as to form a more effective obstacle to the current. The deflectors extend from opposite sides alternately of the walls or the vertical partitions, respectively, 19 20 of the  
 45 depositing-chamber, as seen in Fig. III, so that the current passes from side to side, as indicated by the arrows.

At the proper time for the removal of the deposit access may be had to the inside of the  
 50 horizontal flues by removing one of the sides of the apparatus that incloses the flues, and thus exposing the oxide deposited upon the shelves, which may be easily removed, after

which the side is replaced and the apparatus is again in working order. 55

The oxide of zinc obtained by the combustion of the metal in the ore is not homogeneous; but about one-half of it is exceedingly light and very difficult to deposit. To counteract its buoyancy, a limited amount of steam, 60 just enough to dampen the oxide floating in the current, may be introduced into the current. This will cause the oxide to settle about as soon as the steam has time to condense into water and will afford a cheaper 65 and more satisfactory substitute for the bags now in use for this purpose.

Heat from the furnace which would be otherwise wasted is made available for starting and maintaining a steady current through 70 the depositing chamber and flues. The fact that floating bodies are more easily deposited when taken horizontally is made use of in the form of apparatus shown in Fig. III.

This invention can be used to gather the 75 fumes or smoke from any kind of furnace whenever valuable matter is present.

I claim as my invention—

1. In combination with a flue for collecting fumes, a series of removable deflectors, each 80 having two plates 10 10<sup>a</sup> with recesses upon the opposite sides, a bar connecting the plates, and a standing frame secured upon the plate 10<sup>a</sup> and adapted to support another deflector, as set forth. 85

2. In a zinc-subliming furnace, the combination of the retorts, a passage in communication with the retorts and containing deflectors adapted to receive deposits of the metallic oxide, and an ascending flue in connection 90 with the discharging end of such passage and in proximity to the retorts, so as to cause an upward current through such flue, substantially as set forth.

3. The combination, in a zinc-subliming 95 furnace, of the retorts, a chamber for receiving the metallic fumes from the retorts, a passage containing deflectors, having an induction end open to said chamber and an ascending flue at the eduction end in proximity to 100 the retorts, for the purpose set forth.

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Witnesses:

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