(No Model.) 3 Sheets—Sheet 1.

G. LIEBAU.

FURNACE FOR GALVANIZING POTS OR TANKS.

No. 515,594. Patented Feb. 27, 1894.

Fig. 1.

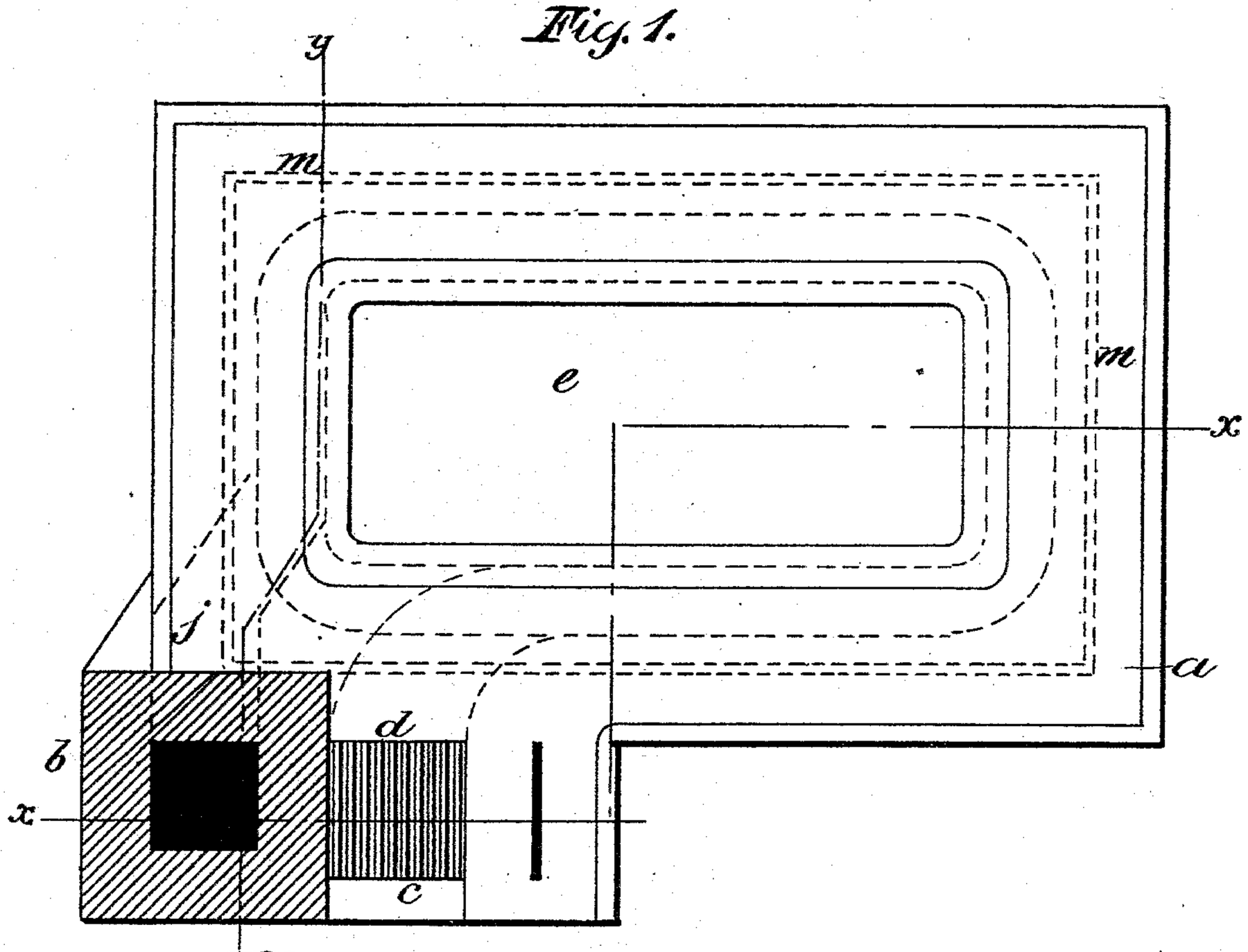
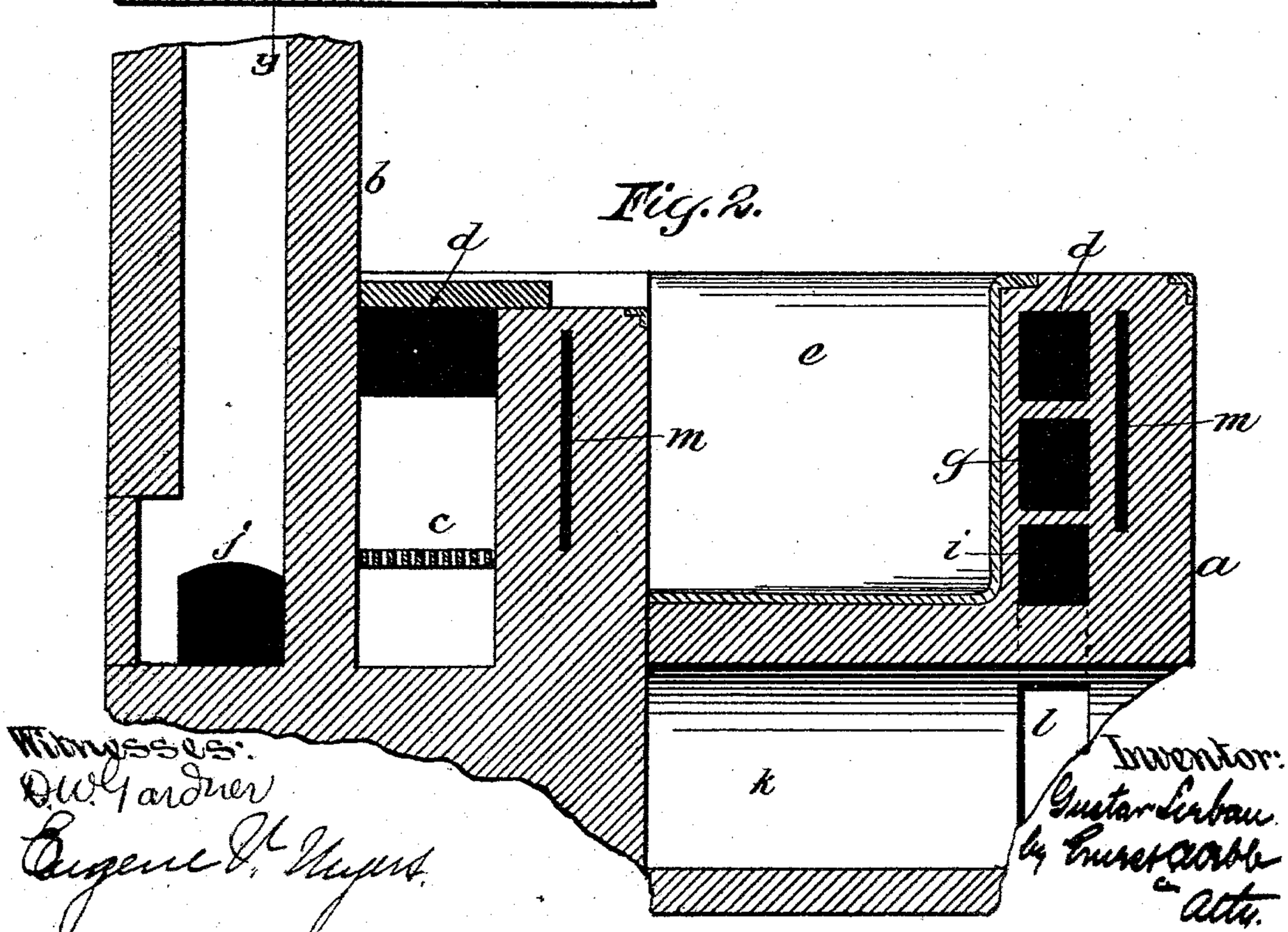


Fig. 2.



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FURNACE FOR GALVANIZING POTS OR TANKS.

No. 515,594. Patented Feb. 27, 1894.

Fig. 3.

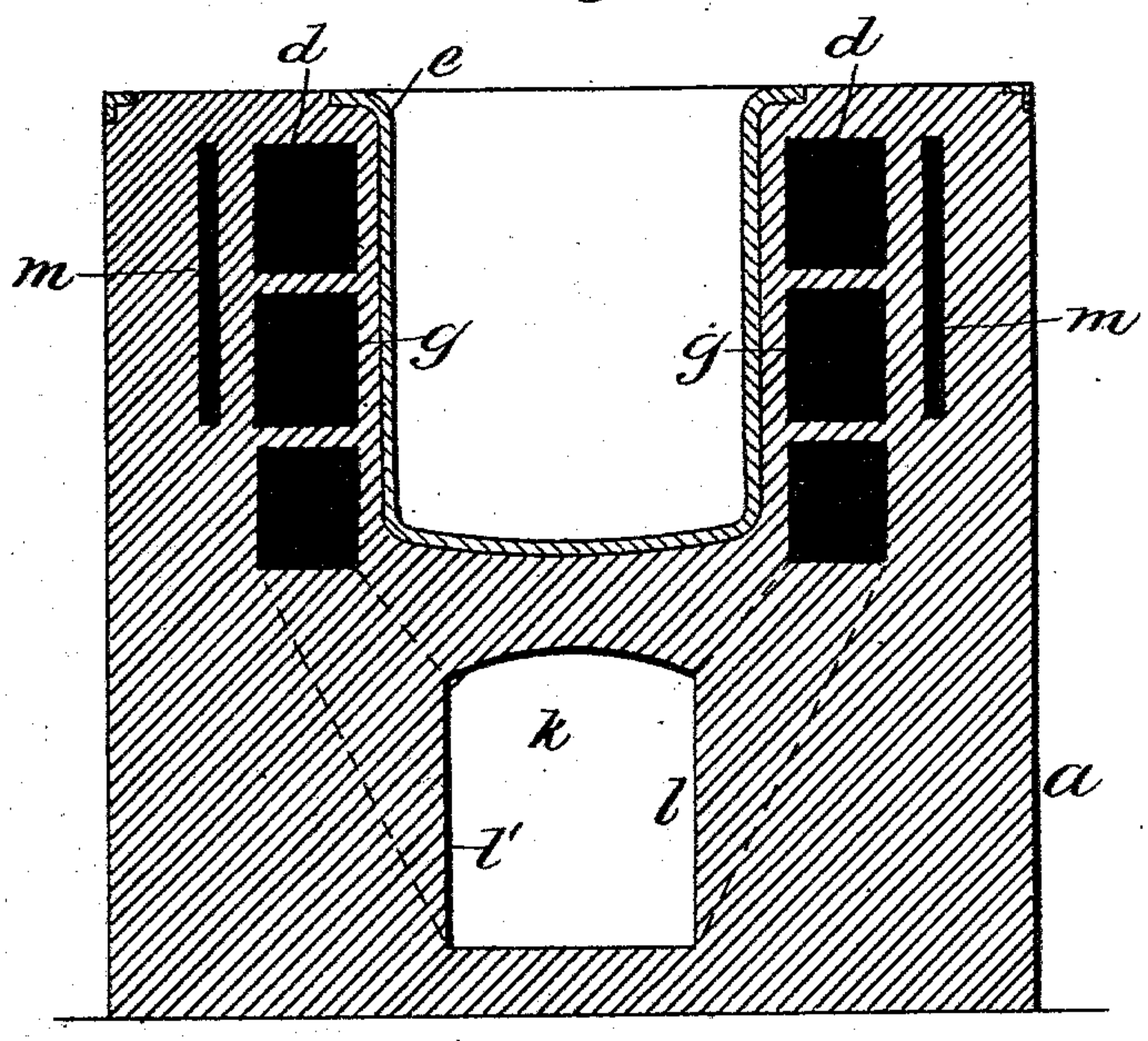
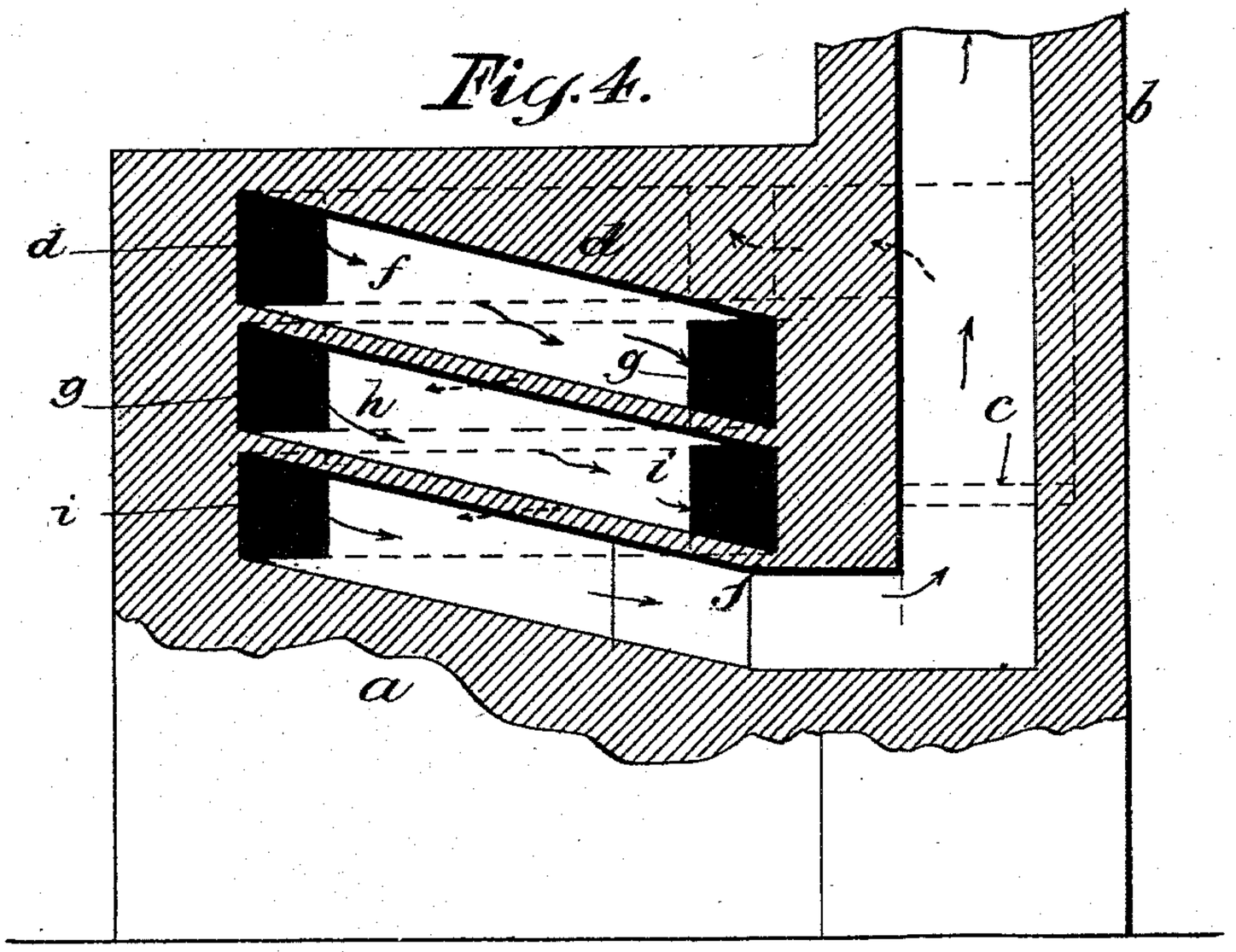


Fig. 4.



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by Munn & Cobb
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FURNACE FOR GALVANIZING POTS OR TANKS.

No. 515,594. Patented Feb. 27, 1894.

Fig. 5

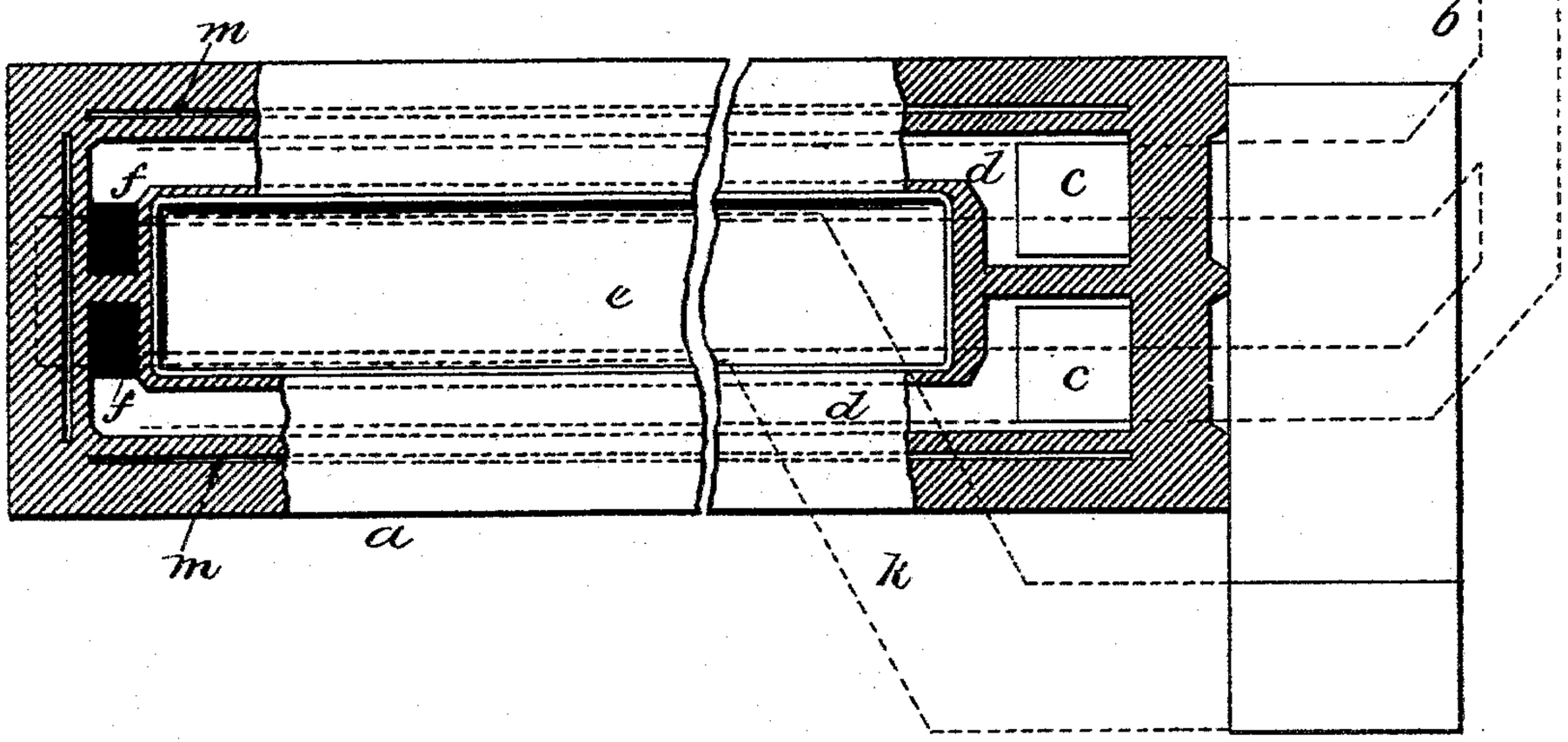

Fig. 6.

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UNITED STATES PATENT OFFICE.

GUSTAV LIEBAU, OF MOSCOW, RUSSIA.

FURNACE FOR GALVANIZING POTS OR TANKS.

SPECIFICATION forming part of Letters Patent No. 515,594, dated February 27, 1894.

Application filed May 15, 1893. Serial No. 474,257. (No model.)

To all whom it may concern:

Be it known that I, GUSTAV LIEBAU, a subject of the Emperor of Germany, residing at Moscow, in the district of Moscow and Empire of Russia, have invented certain new and useful Improvements in Furnaces for Galvanizing Pots or Tanks, of which the following is a specification.

This invention relates to certain new and useful improvements in furnaces for galvanizing and other pots, and has for its object the production of a furnace, the flues of which are so arranged that the flames or products of combustion are directed first to the top of the pot instead of at the bottom, as has heretofore been the case, and in which the flues may be easily reached and cleaned.

To these ends therefore, my said invention consists in a furnace having a series of flues arranged outside of a galvanizing pot or tank, and in heating proximity thereto, the upper flue being in direct communication with the fire pit, and the lower flue communicating with the stack or chimney, as hereinafter more fully described and pointed out in the claims.

Referring to accompanying drawings illustrating my invention, and in the several figures of which like parts are similarly designated, Figure 1, is a top plan view. Fig. 2, is a section taken on the line *x x* Fig. 1. Fig. 3, is a transverse section. Fig. 4, is a transverse section taken on the line *y*, *y*, Fig. 1. Fig. 5, is a top plan view, partly broken away, illustrating a modification of my invention, and Fig. 6, is a vertical longitudinal section thereof.

a, is the masonry work of the furnace provided with the stack or chimney *b*, and the fire pit *c*. The products of combustion generated in this pit, pass upwardly into the flue *d*, which surrounds the galvanizing or other pot or tank *e*, set in the furnace *a*. As shown in the drawings, this upper flue *d*, passes horizontally through the masonry *a*, and around the top of the tank *e*, descending on an incline at *f*, to join the flue *g*, which also surrounds the tank *e*, through masonry *a*, and at *h*, descends on an incline to join the flue *i*, which, in the same manner surrounds the tank, communicating on the incline *j*, with the stack or chimney *b*. Manifestly the arrangement constitutes in reality but one flue passing from the fire pit, encircling the pot or tank at different altitudes, and finally passing out at the stack or chimney. But I do not wish to limit myself to the exact construction herein shown and described as when long tanks are used, such for example as those employed in coating pipe, when more than one fire may be desirable or even necessary, the flues can pass from the fire pit or pits, extend a certain distance around the pot or tank, and then loop or double back on themselves, finally passing out at the stack or chimney, as hereinafter more fully described. The flue series *d*, *f*, *g*, *h*, *i*, and *j*, is preferably constructed of fire brick, which may be fitted into one another and therefore access may be readily had to the interior of the flues to clean or repair them.

Running longitudinally through the masonry *a*, and beneath the tank or pot *e*, is the passage way *k*, and from this passage, opening *l*, and *l'*, normally closed by iron plates, or brick partitions, extend to the lowermost flue, as shown particularly in Figs. 2 and 3. Through said openings the lower loop of the flue series is readily accessible for cleaning or repairing. I also prefer to provide between the flue and the masonry the air space *m*, or this space may be filled with sand, or other non-conducting material, preventing the masonry from overheating, and confining the heat to the flues and the tank or pot.

It will be obvious from the foregoing that the tank or pot is protected from direct contact with the fire, and that the flames in no case touch said tank, by reason of which the tank is rendered more durable, and the liability of "burning through" reduced to the minimum. This end may be still further conduced by coating the tank previous to setting inside and out with a fire proofing compound, adhering to the iron, such as described and claimed in a concurrent application filed by me and designated as Serial No. 474,258 filed May 11, 1893, and when so coated, it will be found that the internal coating greatly reduces the formation of dross, while the heat being applied first to the upper part of the tank, and prevented from external radiation by reason of the air, or non-conducting space *m*, results in a great saving of fuel.

Obviously many changes may be made in the construction described and illustrated herein without departing from the principle and scope of my invention, the gist of which lies

in applying the heat of the furnace first to the upper part of a galvanizing or other tank.

In Figs. 5 and 6, of the drawings, I have shown a modification particularly adapted for long tanks, such as those used for coating pipes. In this modification, two fire places *c*, *c*, are used, preferably separated by the strip of masonry *m'*. From each of these fire-places the upper flue *d*, passes along one side of the pot or tank, and around the end thereof opposite said fire-places, communicating through *f*, with the flue *g*, thence through *h*, to flue *i*, thence through *f'*, to flue *y*, at or near the bottom of the pot or tank, and thence through *j*, to the stack or chimney *b*. The flues are made into two independent series by the tongue of masonry m^2, at the end of the tank opposite the fire-places, and obviously as few or as many flues may be used in the series as may be desirable but I have found in practice the construction and number herein set forth, productive of good results. It will be apparent also that the flues may communicate with each other either directly, abruptly, and at right angles, or by a gradual incline, as shown in Fig. 4, without departing from the principle and scope of my invention. Other modifications may also be made, such, for instance, as placing a fire at diagonally opposite ends, but I prefer the construction shown and described, as it leaves the pot or tank readily accessible by the workmen. Again the fire places may be more widely separated, and extend a short distance along the opposite sides of the tank, at the same end thereof, without materially changing or altering the construction and arrangement of the flues, or other parts of the invention.

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

1. In furnaces for galvanizing and other pots and tanks, a pot or tank, and a suitable number of vertical series of connected flues surrounding the same, the topmost of said flues communicating directly with the fire, and the lowermost of said flues with the stack or chimney, substantially as described.

2. A pot or tank, a plurality of fire-places at or near one end thereof, and a vertical series of connected flues from each fire-place, extending about said pot or tank in a substantially horizontal direction and adapted to apply the products of combustion first to the top of said pot or tank, and then downwardly in successive stages, the lower flue of each series communicating with the stack or chimney, substantially as described.

3. In furnaces for galvanizing and other pots and tanks, a pot or tank, a vertical series of connected flues arranged outside thereof and in heating proximity thereto, the upper flue communicating with the fire, and the lower flue with the stack or chimney, and a course of refractory material interposed between the flues and the pot or tank, whereby said products of combustion are prevented from coming in direct contact with said pot or tank, substantially as described.

4. In furnaces for galvanizing and other pots and tanks a pot or tank, a suitable number of flues arranged above, and opening into, one another, and surrounding, but separated from immediate contact with the pot or tank; a suitable number of combustion chambers, and a suitable number of outlets for the products of combustion; connections from the former to the uppermost of said flues, and connections from the latter with the lowermost of said flues; the heat and products of combustion passing directly into the uppermost of said flues, thence around the pot or tank, and thence to the outlets, thereby applying the most intense heat to the most exposed portion of the metal bath in the pot or tank, and at the same time removing the heat from immediate contact therewith, substantially as described.

Signed at New York, in the county of New York and State of New York, this 9th day of May, A. D. 1893.

GUSTAV LIEBAU.

Witnesses:
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EUGENE V. MYERS.