(No Model.) 3 Sheets—Sheet 1.

C. F. MILLER.

FURNACE.

No. 432,542. Patented July 22, 1890.

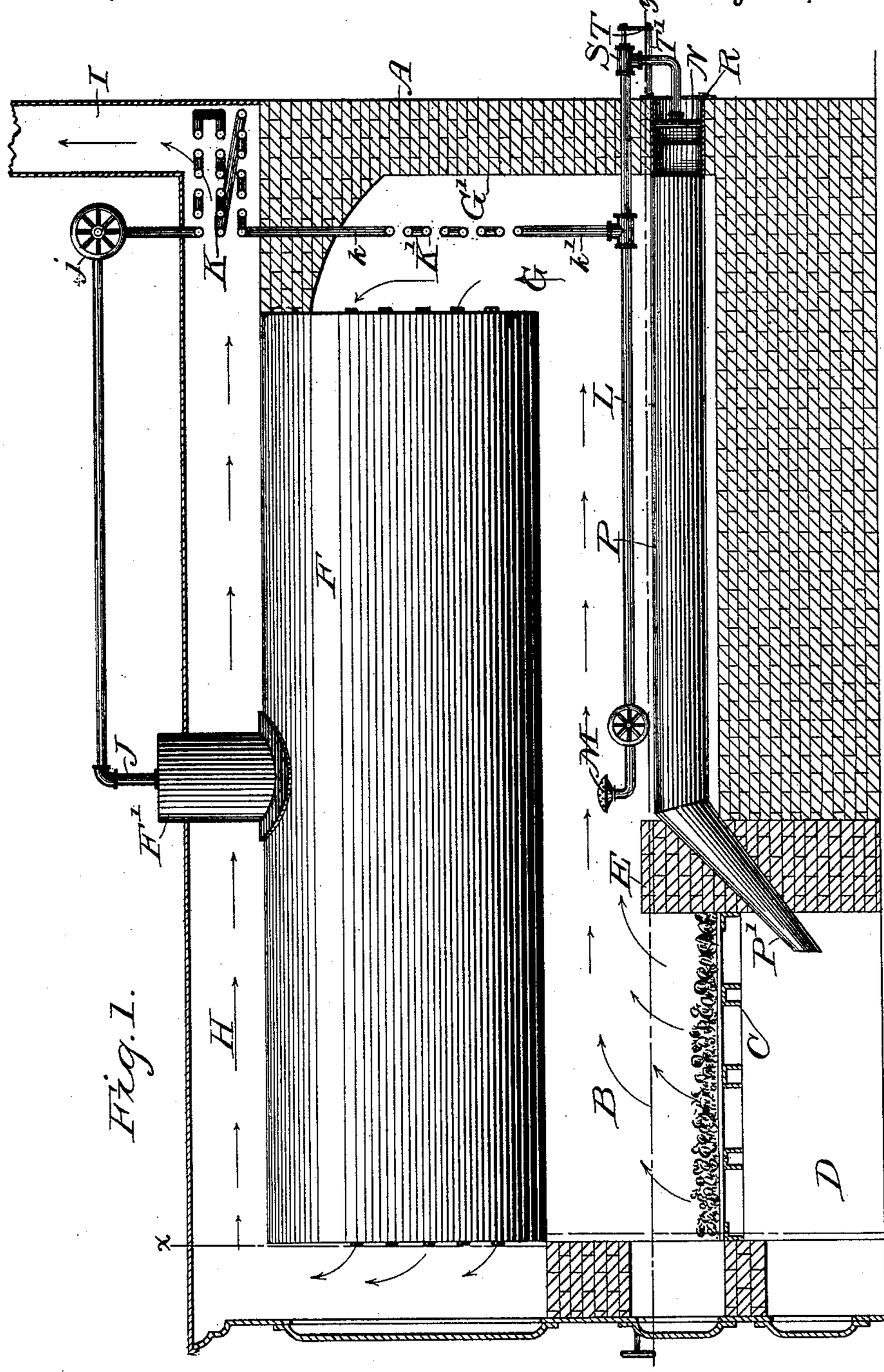

Fig. 1.

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Fig. 4.

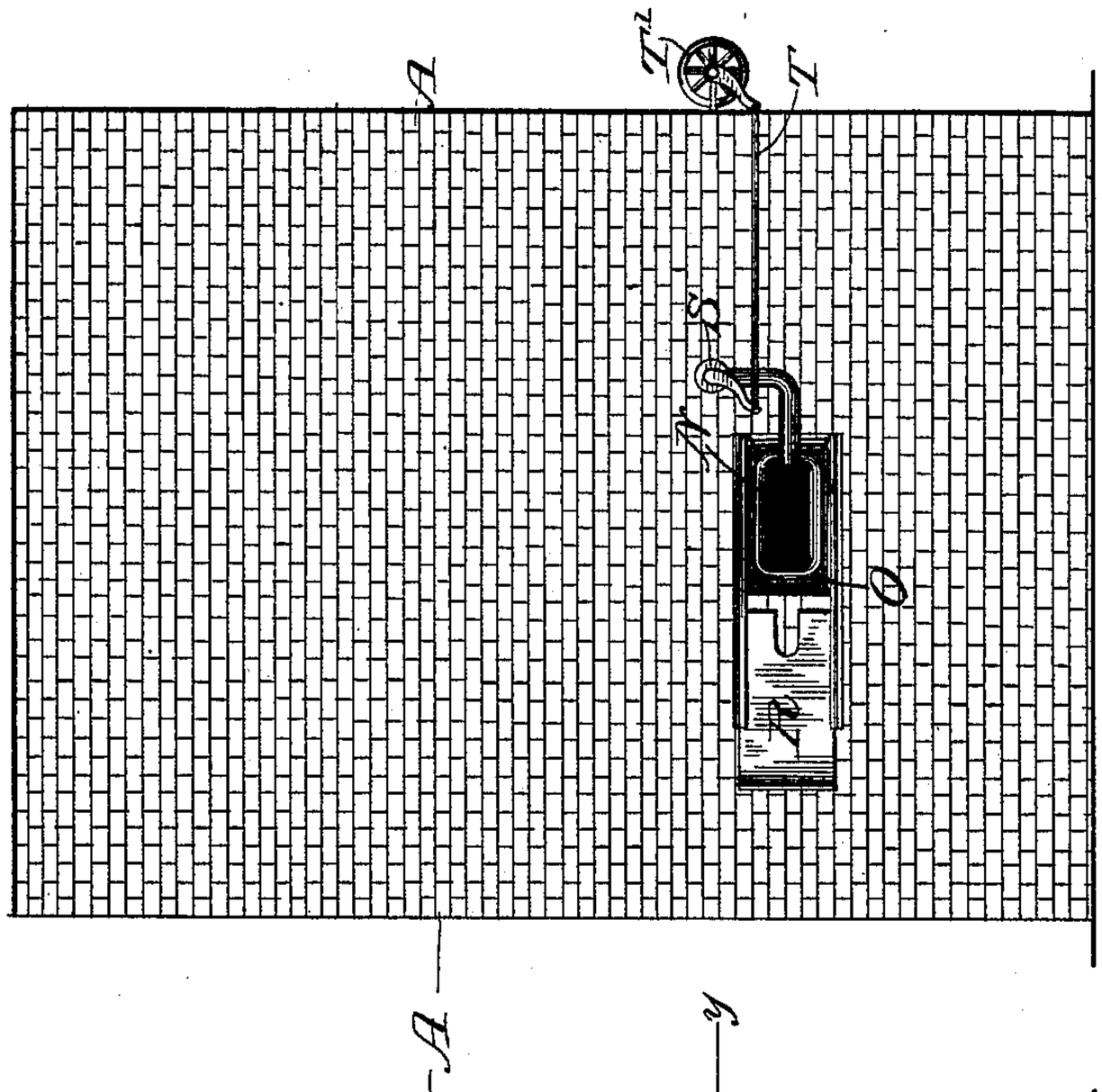
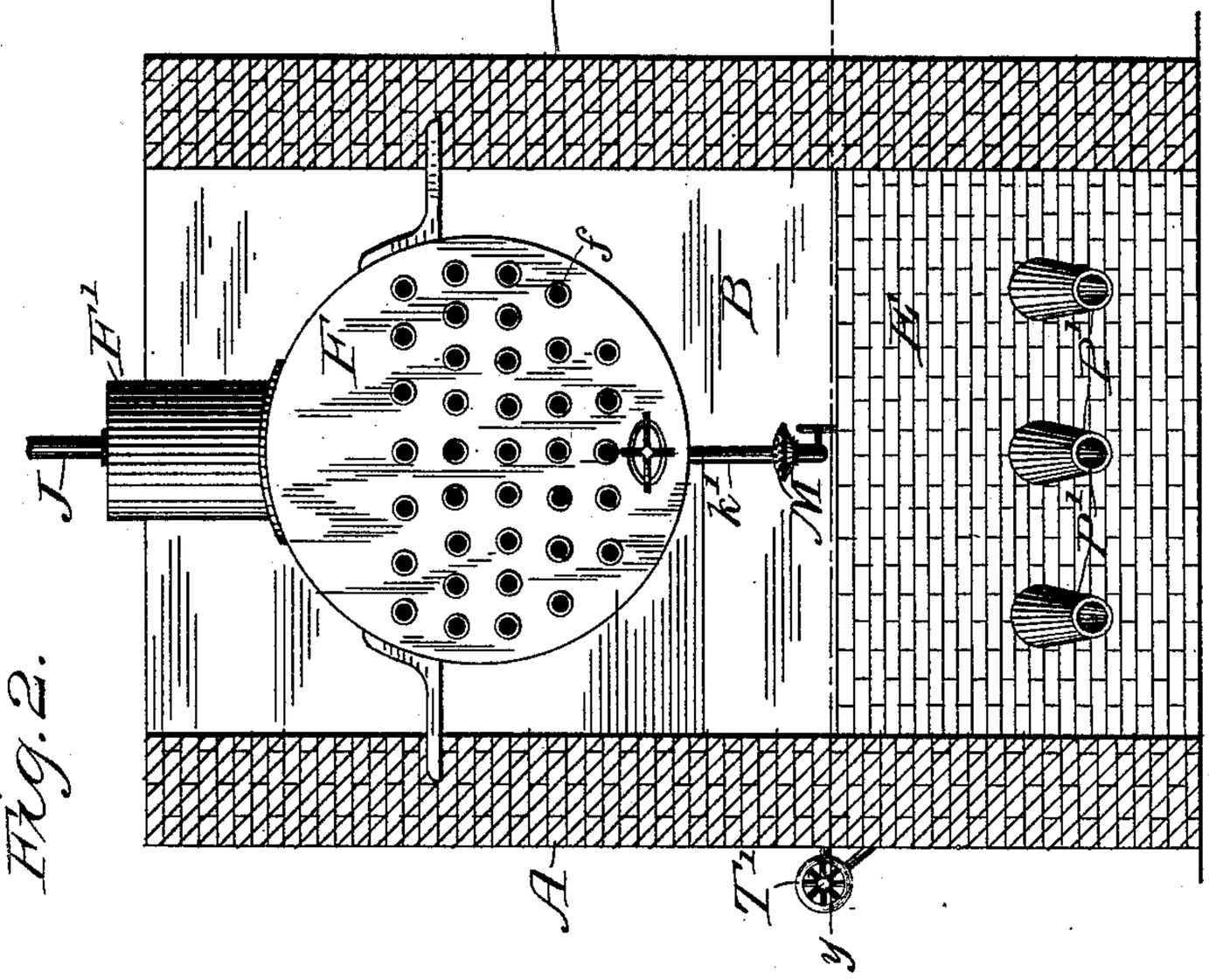


Fig. 2.



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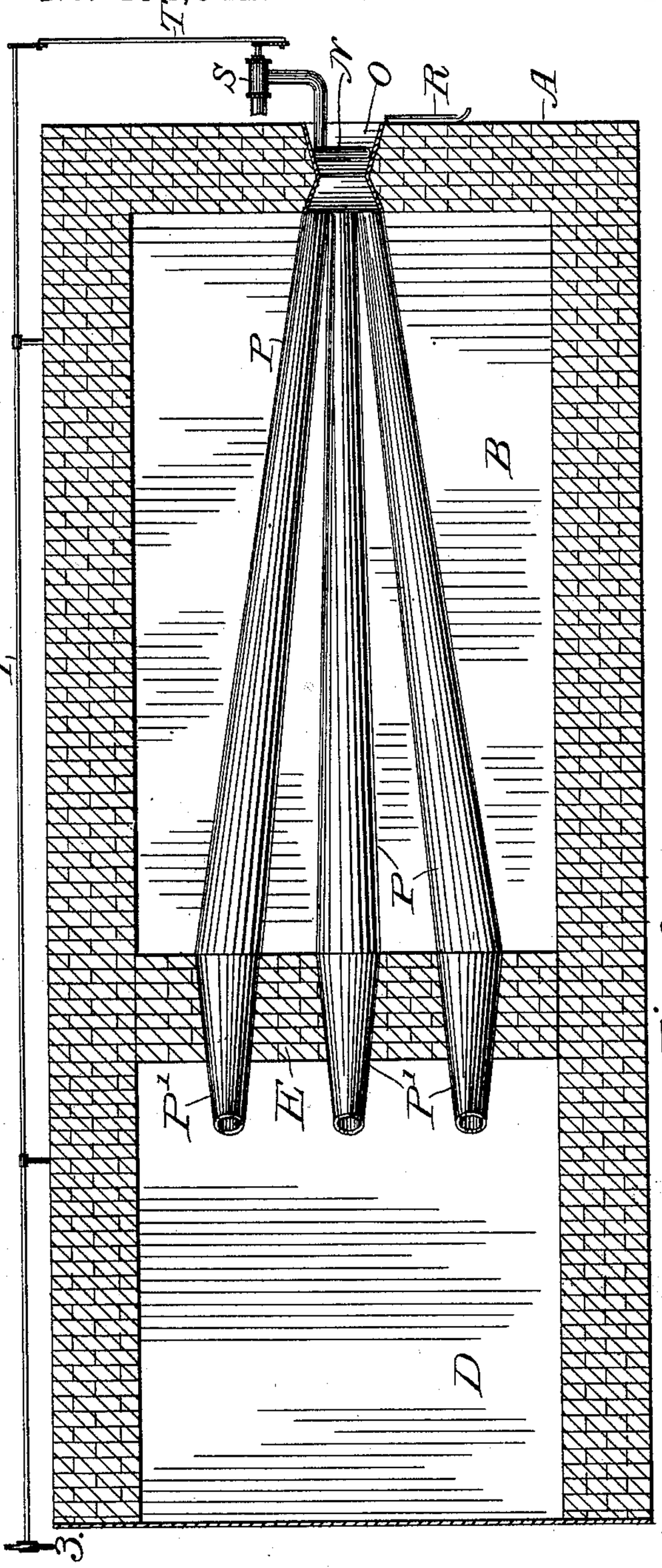


Fig. 3.

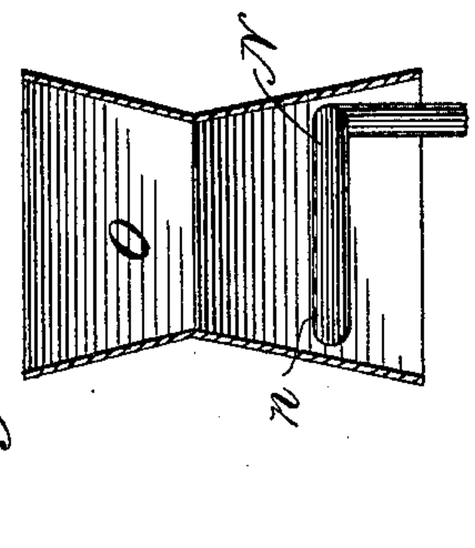


Fig. 6.

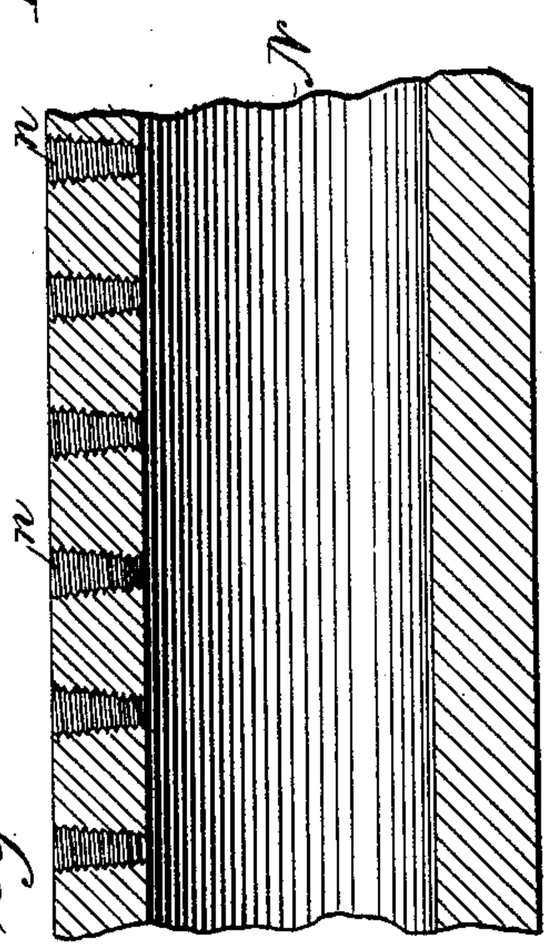
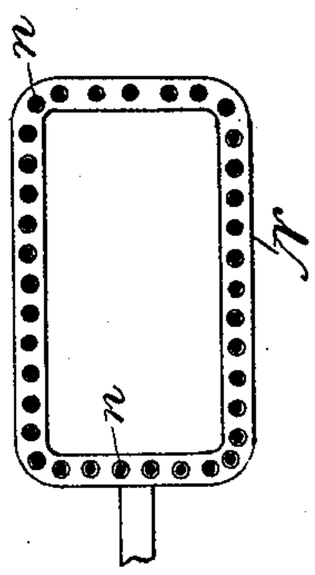


Fig. 5.



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UNITED STATES PATENT OFFICE.

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FURNACE.

SPECIFICATION forming part of Letters Patent No. 432,542, dated July 22, 1890.

Application filed April 18, 1890. Serial No. 348,548. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. MILLER, a citizen of the United States, residing at Lancaster, in the county of Lancaster and State of Pennsylvania, have invented certain new and useful Improvements in Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention is an improvement on Patent No. 418,955, granted to me January 7, 1890. The chief advantages of said improvement over said patent are that the pipes conveying the superheated steam are all within the furnace; that this steam is applied more effectively for causing the inflow of air; that the same superheated-steam pipe is made to supply a steam-jet under the boiler and another, as a steam-blower, into the air-tubes; that these tubes have a simpler and more satisfactory construction than in said patent, and that various other details of the furnace have been made more effective, all these ends being attained by the construction and combination of devices hereinafter more particularly set forth and claimed.

In the accompanying drawings, Figure 1 represents a vertical central longitudinal section of a furnace embodying my invention. Fig. 2 represents a vertical cross-section of the same on the line *x x* of Fig. 1. Fig. 3 represents a horizontal longitudinal section of the same on the line *y y* of Figs. 1 and 2. Fig. 4 represents a rear end elevation of the same. Figs. 5, 6, and 7 represent detail views of the blower.

A designates the masonry of the furnace and boiler setting; B, the combustion-chamber; C, the grate; D, the ash-pit; E, the fire-bridge; F, the boiler, which is horizontal, having longitudinal hot-air tubes *f;* G, the passage leading from the combustion-chamber to one end of said tubes, and H the corresponding passage above said boiler leading from the other end of said tubes to the chimney-flue I. In these parts as thus far enumerated there is nothing new.

From the steam-dome F′ of the boiler a pipe J, controlled by a globe-valve *j*, extends to a superheating-coil K, arranged in the flue I. Thence the superheated steam passes down by a pipe *k* to a second superheating-coil K′ in a space G′, which is an expansion of passage G, the said second coil being intensely heated by the products of combustion before these enter the hot-air tubes *f* of the boiler. Thence a pipe *k′* extends downward a short distance to a horizontal pipe L, which extends forward as far as the fire-bridge and rearward out through the end wall of the furnace. The forward end of this pipe is provided with a blast-nozzle M for discharging the excessively superheated steam against the under side of the boiler. The other end of said pipe L is bent around outside of the furnace-wall and returned to the same for creating a powerful air-feed. To effect this the said pipe is at this point connected to a blower N, consisting of a pipe or hollow casting having the form of a rectangle. This pipe or casting is perforated with a number of outlets *n*, each being spiral in form to secure a better admixture of the air and steam as the latter rushes violently out of said blower. The discharge is directly into a doubly-flared blower-casing O, the inner end of which receives the tapering outer ends of several air-inlet pipes P. These diverge and continually increase in diameter until they reach the fire-bridge E. They then taper in the other direction and incline downward, as indicated at P′, to avoid the grate C. They finally discharge into the ash-pit D. The repeated superheating of the steam on its way to the blower insures a prodigious blast, if the air-inlet be left fully open and the flow of steam unchecked; but I have both of these elements under command. A slide R, movable across the mouth of the blower-casing, cuts off at will more or less of the supply of air, while a valve S in the steam-pipe L is operated by an angle-lever T to cut off the steam partly or wholly, as desired. For convenience of manipulation a long rod or handle T′ extends from said lever to the front of the furnace.

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

1. In combination with a furnace and boiler, a steam-pipe leading from the latter and formed in coils, one above the boiler to be acted on by the heat after it has passed through the boiler, and the other below it and being heated by the hot air before it enters said boiler, and two discharge-openings for said superheated steam, one under the boiler and the other into an air-flue which discharges under the grate, substantially as set forth.

2. In combination with a furnace and boiler, a steam-pipe leading from the latter and formed in coils, one above the boiler to be acted upon by the heat after it has passed through the boiler, and the other below it and being heated by the hot air before it passes through the boiler, a valve controlling the flow of steam into said coils, two discharge-openings for said superheated steam, one under the boiler, the other into an air-flue which discharges under the grate, and two valves which control the flow of steam both into the air-flue and against the boiler.

3. In combination with a combustion-chamber, boiler, and superheating steam-pipe extending from the latter, an air-inlet pipe discharging under said combustion-chamber and a perforated pipe or casing discharging steam into said air-inlet pipe, the steam-supply being derived from said superheating steam-pipe, and both the air-inlet and steam pipe being provided with valves for controlling the supply of air and steam, substantially as set forth.

4. A steam-blower, in combination with a group of several air-feed pipes or air-inlet pipes, all of which taper and incline together, ending in the blower-casing, the combustion-chamber supplied by said pipes, the steam-boiler, and connections between said boiler and blower, substantially as set forth.

5. A series of air-feed pipes, all converging into a common air-inlet opening, in combination with a steam-blower discharging into said inlet, a boiler, and a superheating-pipe supplying said blower, and a combustion-chamber supplied by said air-feed pipes and heating said boiler, substantially as set forth.

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

CHARLES F. MILLER.

Witnesses:

D. MILES SHERTZ,

JACOB HALBACH.