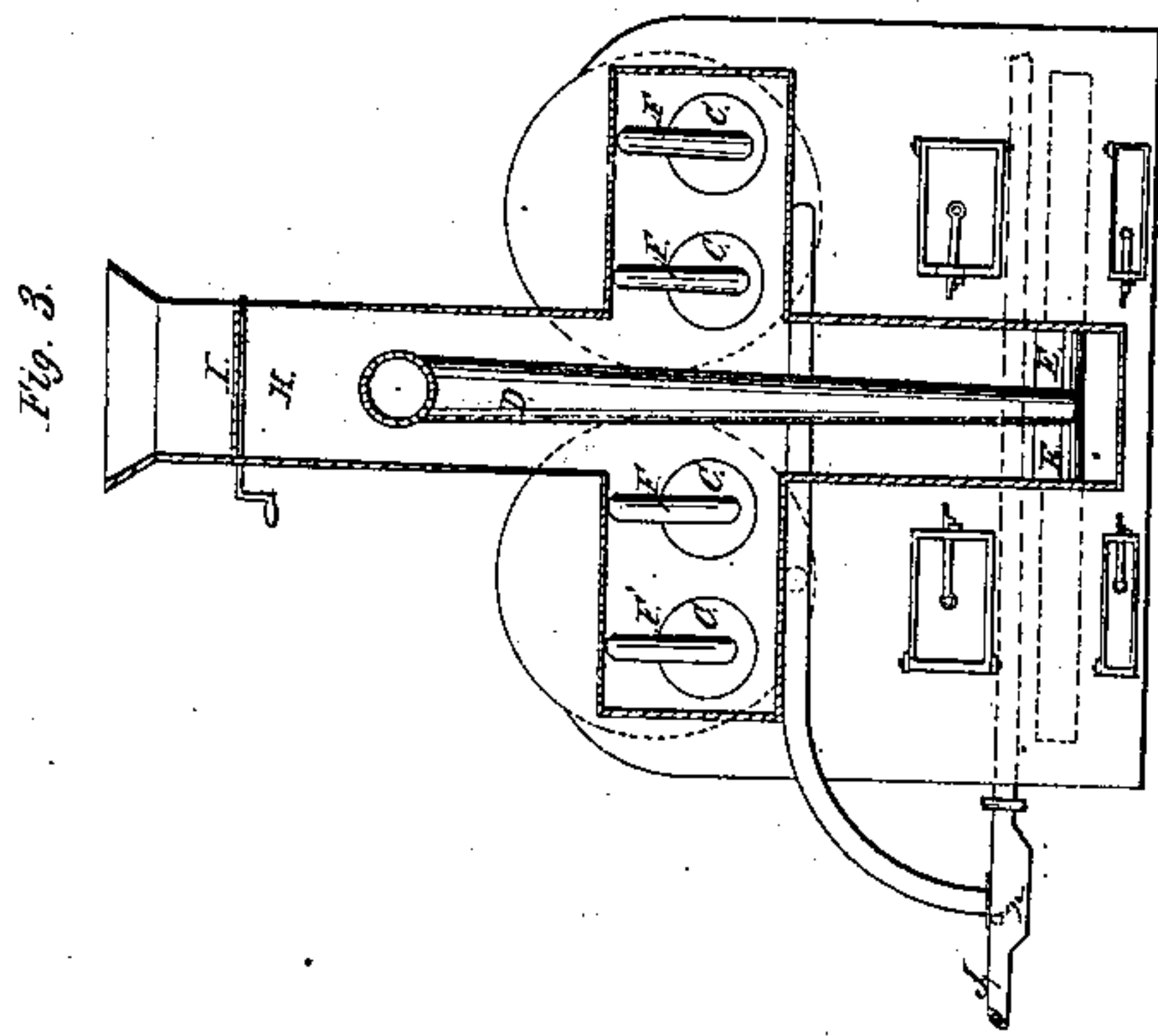
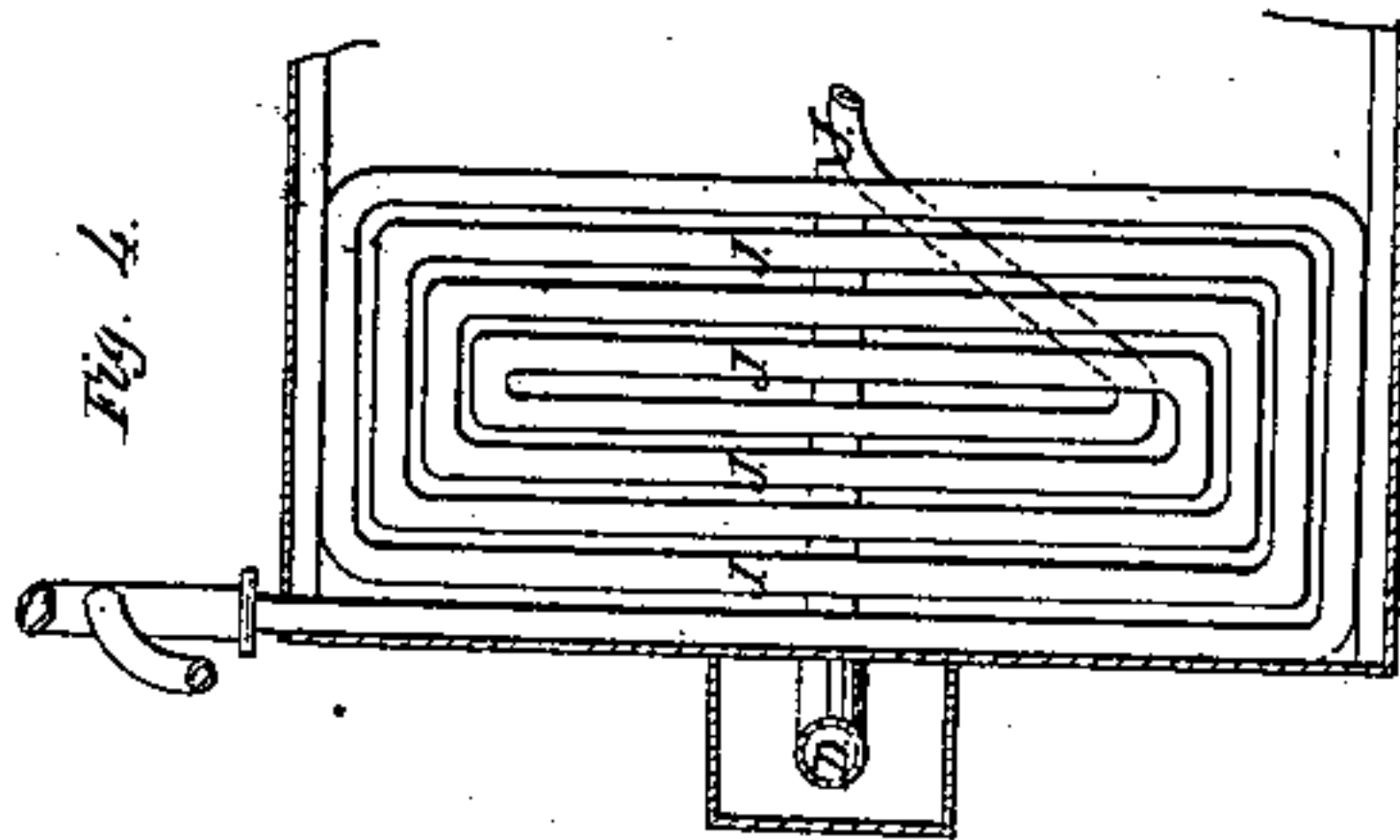
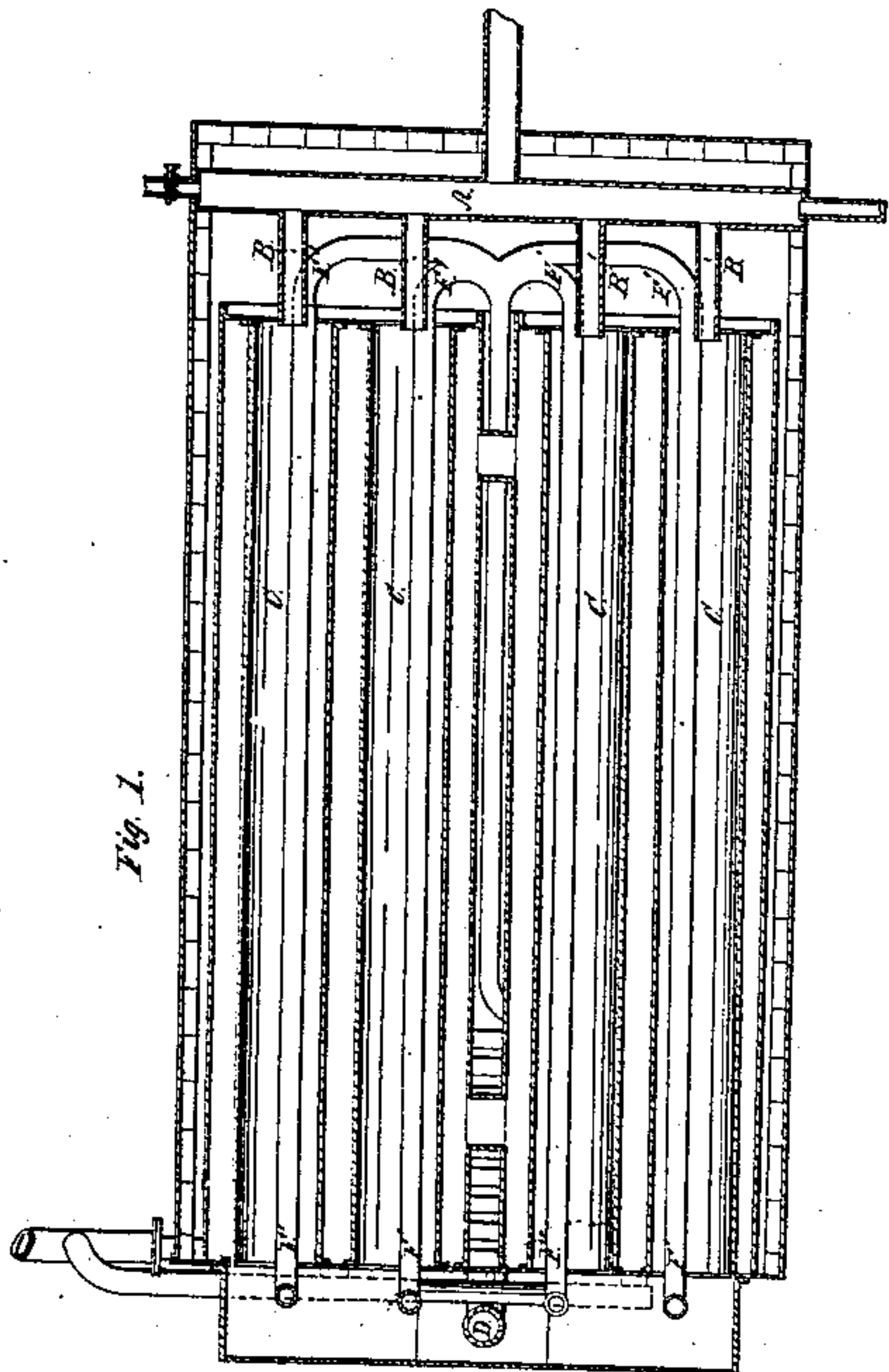
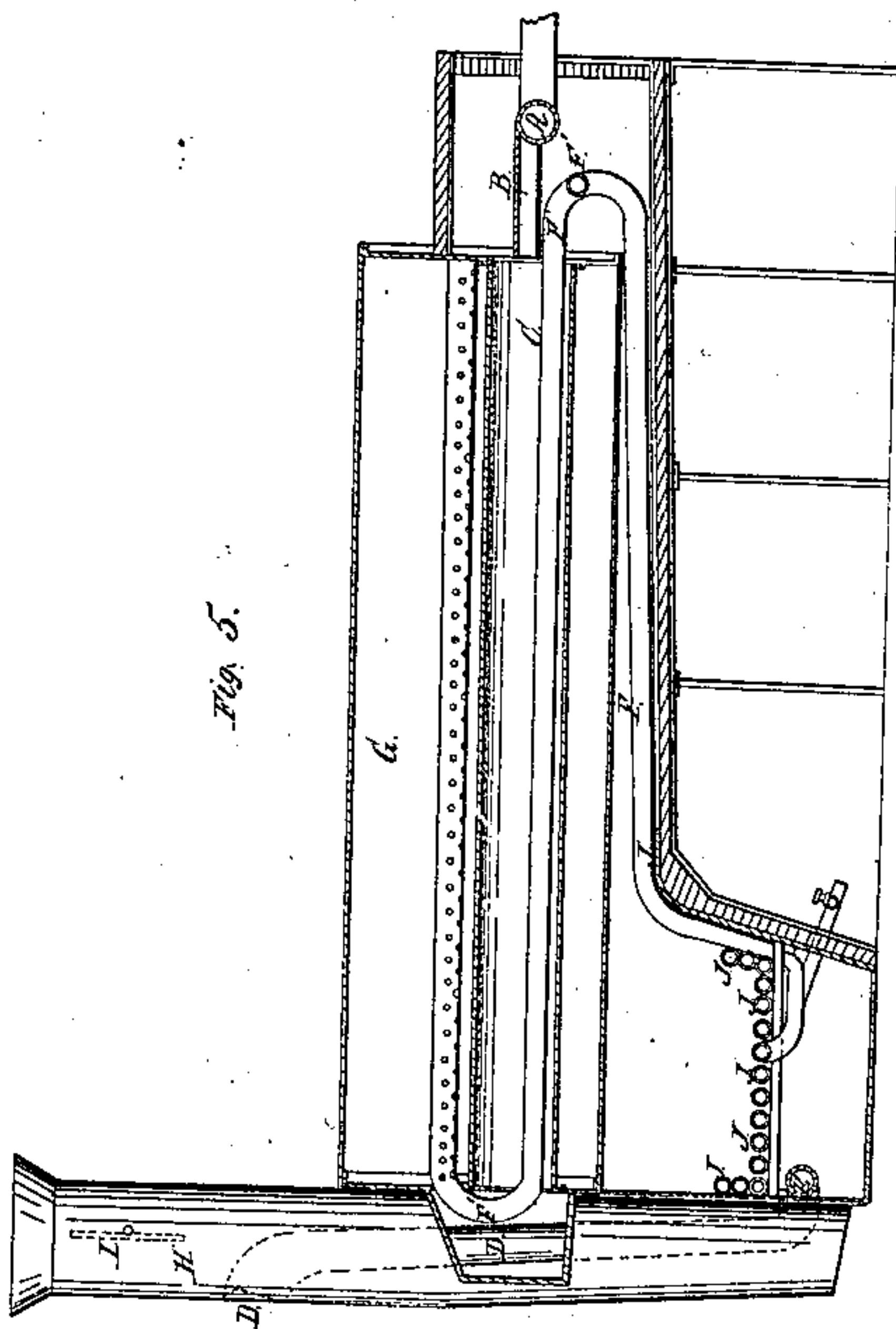
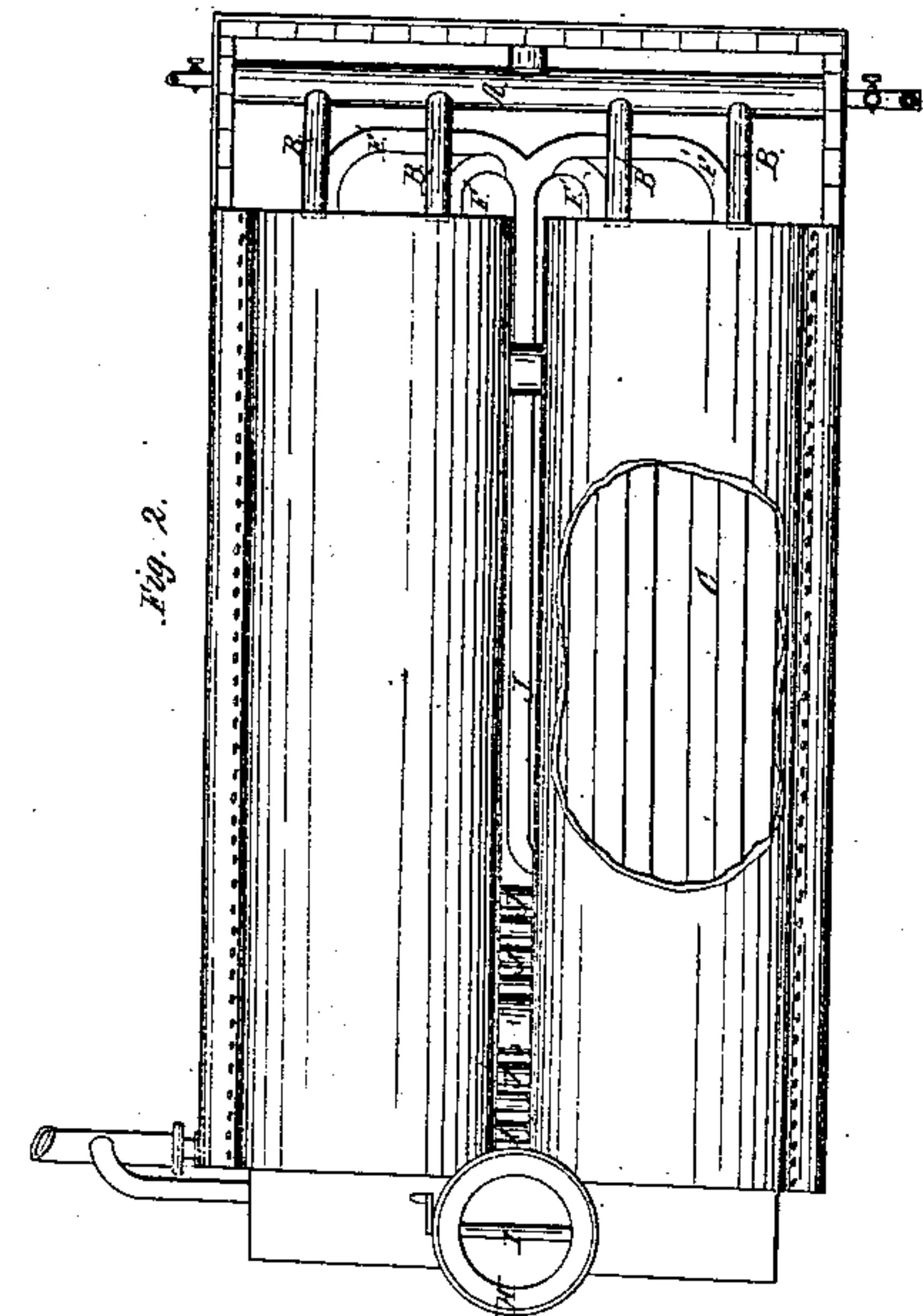


T. Champion,
Steam-Boiler Furnace,
No 13,146,
Patented June 26, 1855.



UNITED STATES PATENT OFFICE.

THOMAS CHAMPION, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVED STEAM-BOILER FURNACE.

Specification forming part of Letters Patent No. 13,146, dated June 26, 1855.

To all whom it may concern:

Be it known that I, THOMAS CHAMPION, of the city and county of Washington, in the District of Columbia, have invented certain new and useful Improvements in the Arrangement of Steam-Boilers and Their Furnaces for Facilitating the Burning of the Ordinary Waste Steam and Gases; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, in which—

Figure 1 represents a horizontal section through the boiler. Fig. 2 represents a top plan with a portion of one of the shells broken away. Fig. 3 represents an elevation, partially in section, of that end of the boiler nearest to the fire-box or furnace. Fig. 4 represents a top view of the fire-box; and Fig. 5 represents a side elevation, in section, with a portion of the chimney or stack broken away.

Similar letters where they occur in the several figures denote like parts.

My invention relates to that class of steam-boilers and furnaces wherein the steam and products of combustion are returned to the furnace to be burned or to aid in the combustion of the fuel; and it consists in the arrangement of devices by which the escape-steam is caused to carry back with it the gases or heated products of combustion to the fire again and again until they are consumed, thus economizing fuel.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawings.

The boiler may be constructed in any of the usual well-known forms of horizontal or upright boilers, and may be set in brick-work or inclosed in a metallic case. At or near that end of the boiler where the furnace is located I place a drying-pipe A, into which the escape-steam from the engine is conveyed, and where it is dried preparatory to its being carried back into the fire. This pipe A is furnished with as many branch pipes B as there are flues or sets of flues in the boiler or of boilers. These branch pipes B lead into the flues C, where they deliver up their steam, mingling it with the gas escaping from the furnace, and the force of the steam carrying the gases thus commingled through the flues back underneath the grate-bars and into the fire to be

consumed entirely, or so much thereof as the combustion will take up, the balance, if any, passing around again and again by the circulation caused by the steam.

To aid the combustion or supply the heated products with atmospheric air, I place in the stack an inverted-conical-shaped pipe D, which passes down to the space underneath the fire, where it unites with a transverse pipe E in the front part of the ash-pit, said pipe E being provided with a series of apertures or openings, through which the air taken in at D, and which becomes rarefied in passing through D, is escaped into the fire to aid combustion.

The fire-box is composed of a coiled pipe J, through which water is fed into the boiler, and which pipe, after leaving the fire-box, is conveyed back through the fire-space F, and at the rear of the boiler it branches off into a series of tubes F' as many as there are flues, and return through the flues C, and thence into the upper part of the boiler G, where they are perforated to discharge the water into the boiler, all of which is distinctly seen in Fig. 5.

The stack or chimney H is furnished with a damper I, and the several pipes are furnished with stop-cocks, blow-offs, &c., which are incidental to steam-boilers in general and need not be particularly described.

When the fire is started in the engine, the smoke and gases escape through the flues and into the stack or chimney in the ordinary way; but when the fires are up and the engine under way the damper I and the furnace and draft doors are closed. The steam from the engine is then let into the pipe A, and through its branches into the flues C, where it mingles with and drives the smoke and other gases back into the fire to be consumed, and thus it continues to furnish a forced draft through and through the flues and back into the fire, the necessary atmospheric air being furnished in streams through the pipes D E to keep up regular combustion.

The steam in my arrangement acts as an artificial blower to the fire; but, instead of blowing atmospheric air to the fire, it carries back with itself all the heated products of combustion to be burned up in the fire-chamber. I thus have more than the ordinary benefit of a blower, while I save its expense in wear and tear.

The pipes F', instead of returning through the flues and entering the boiler at the front, may be carried into the boilers at their rear, their main office being to supply the boiler with water; and, instead of carrying the gases into the fire through the ash-pit or space below the fire, I can divide them, taking a portion in below and a portion in at the top or over the fire, and in some forms of boilers all the gases may be carried in over the fire.

I am aware that it has been attempted to keep up a circulation in a steam-boiler furnace with a closed stack by means of a fan-blower; but this requires power to drive the fan and is otherwise expensive. I cause the steam itself, which becomes one of the auxiliary products of combustion, to carry with it, by the force of its own volume, all the heated products back into the fire, producing an artificial circulation in a furnace with a closed stack and draft-holes, and serving every

purpose of a fan-blower without any of its objections.

There are many of the details of my general arrangement, which are not specially referred to; but, as they are shown in the drawings, it is not deemed necessary to allude to them further.

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

Using the exhaust-steam in a closed stack as a blower to return the heated gases or products of combustion with which it commingles back through flues or passages to the fire again and again to be reburned, substantially as described.

THOMAS CHAMPION.

Witnesses:

A. B. STOUGHTON,
J. D. CLARK.