

No. 787,106.

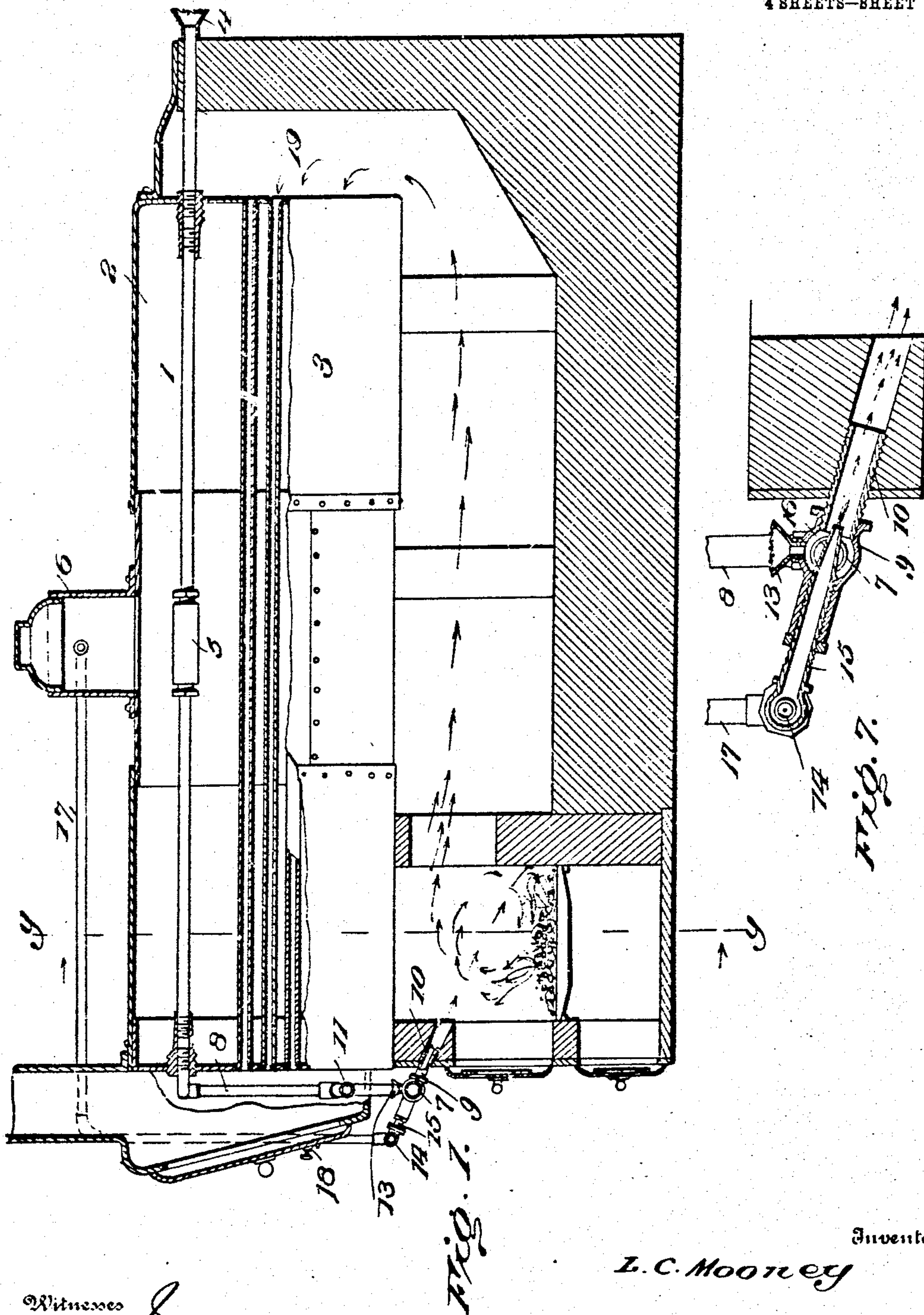
PATENTED APR. 11, 1905.

L. C. MOONEY.

SMOKE CONSUMING FURNACE.

APPLICATION FILED DEC. 22, 1903. RENEWED OCT. 26, 1904.

4 SHEETS—SHEET 1.



Witnesses

for him
Jno. Wheeler

Inventor

L. C. Mooney

By

Wm. H. Macy, Attorney

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4 SHEETS—SHEET 2.

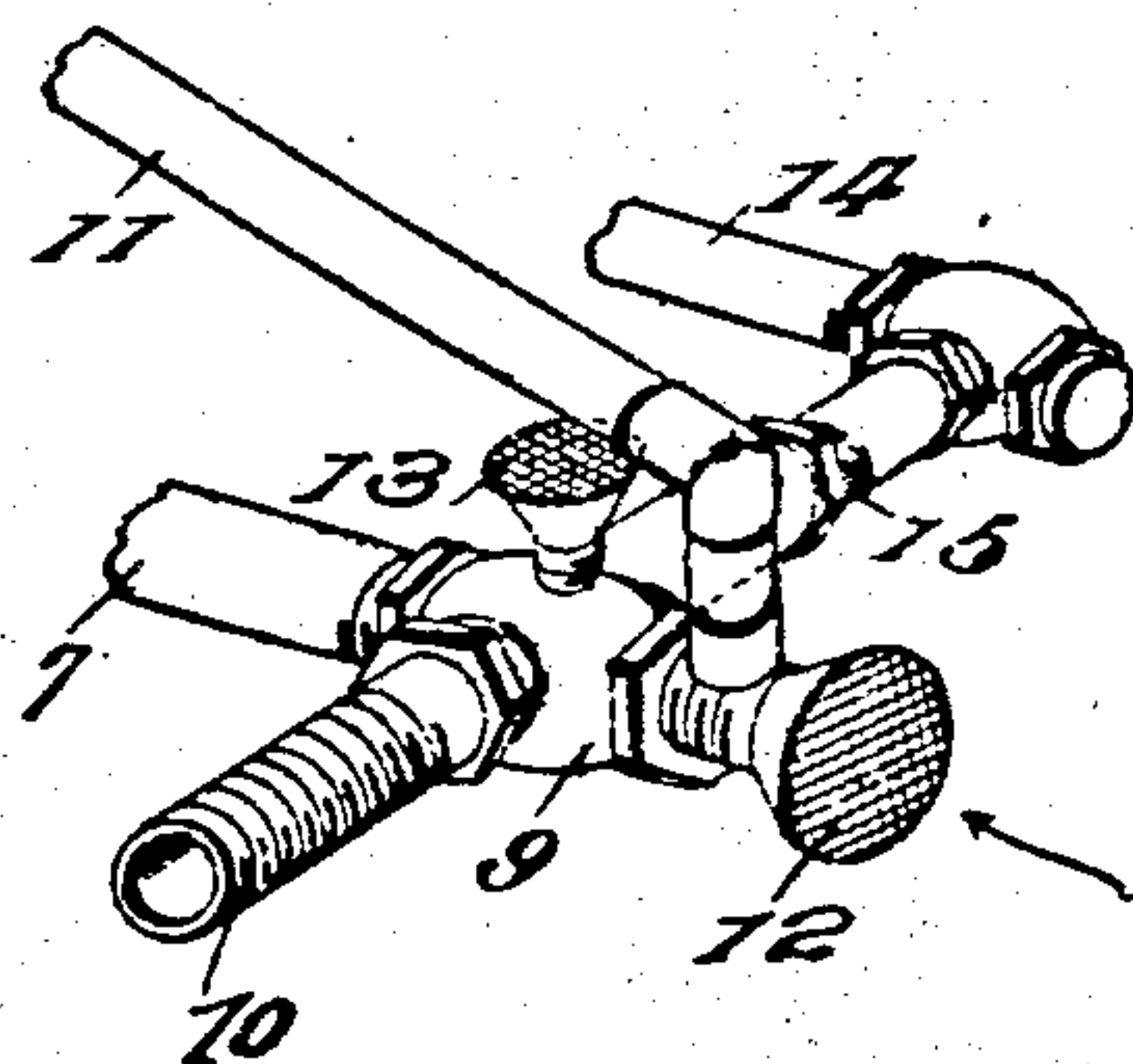
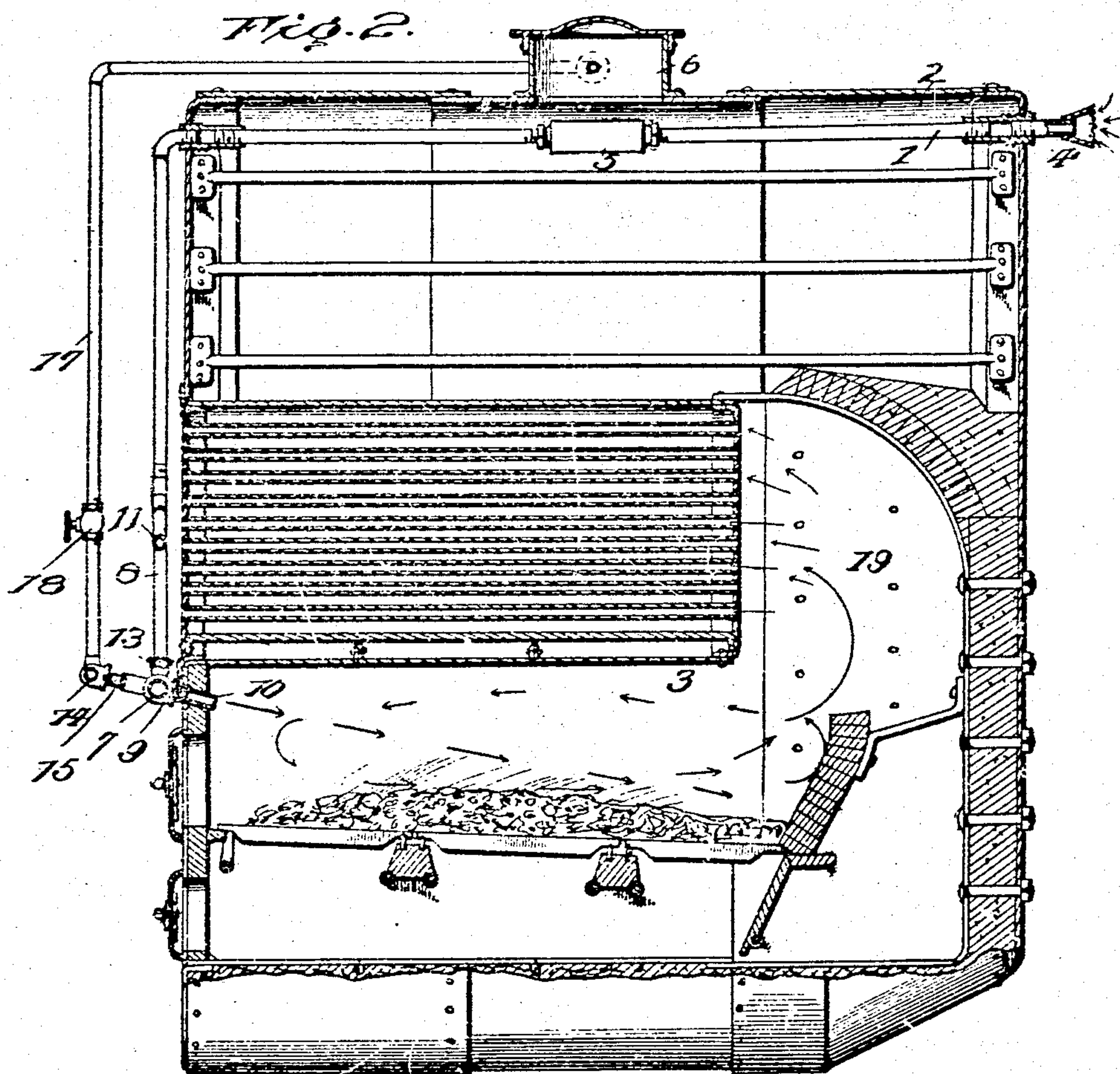


Fig. 8.

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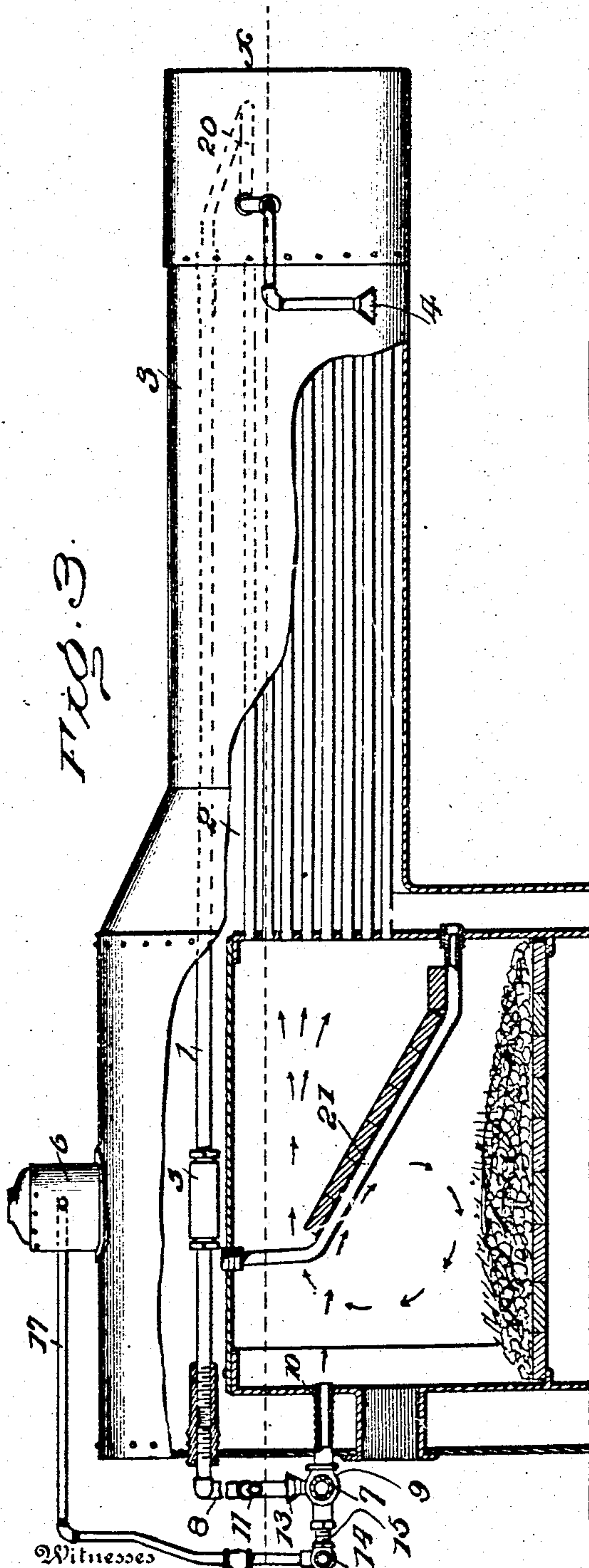
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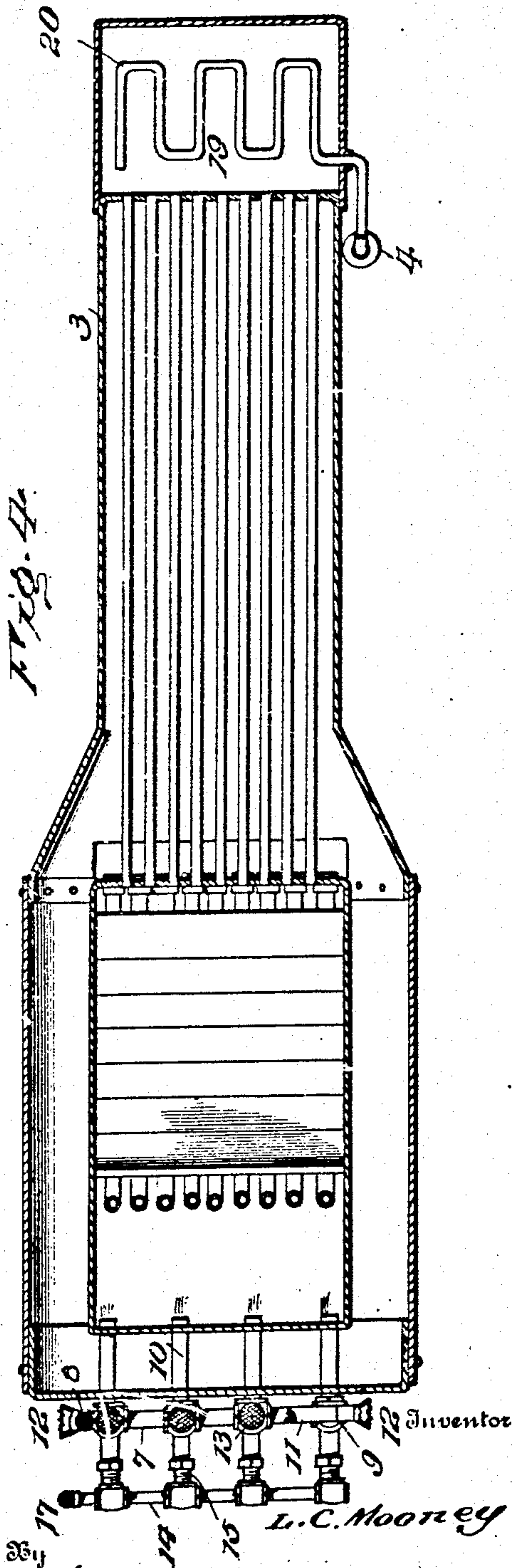
4 SHEETS—SHEET 3.

Fig. 3.



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Fig. 4.



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4 SHEETS—SHEET 4.

Fig. 6.

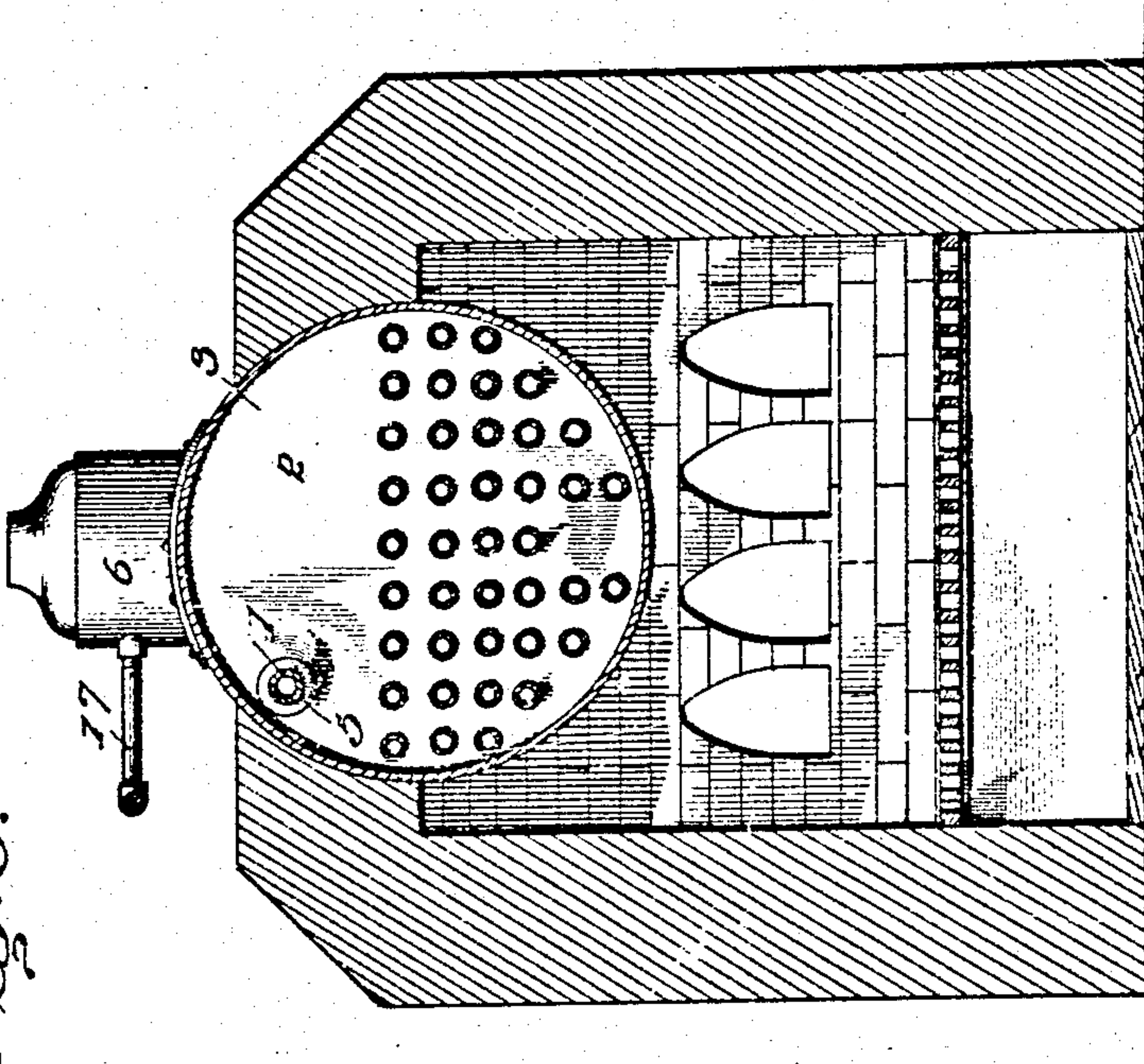
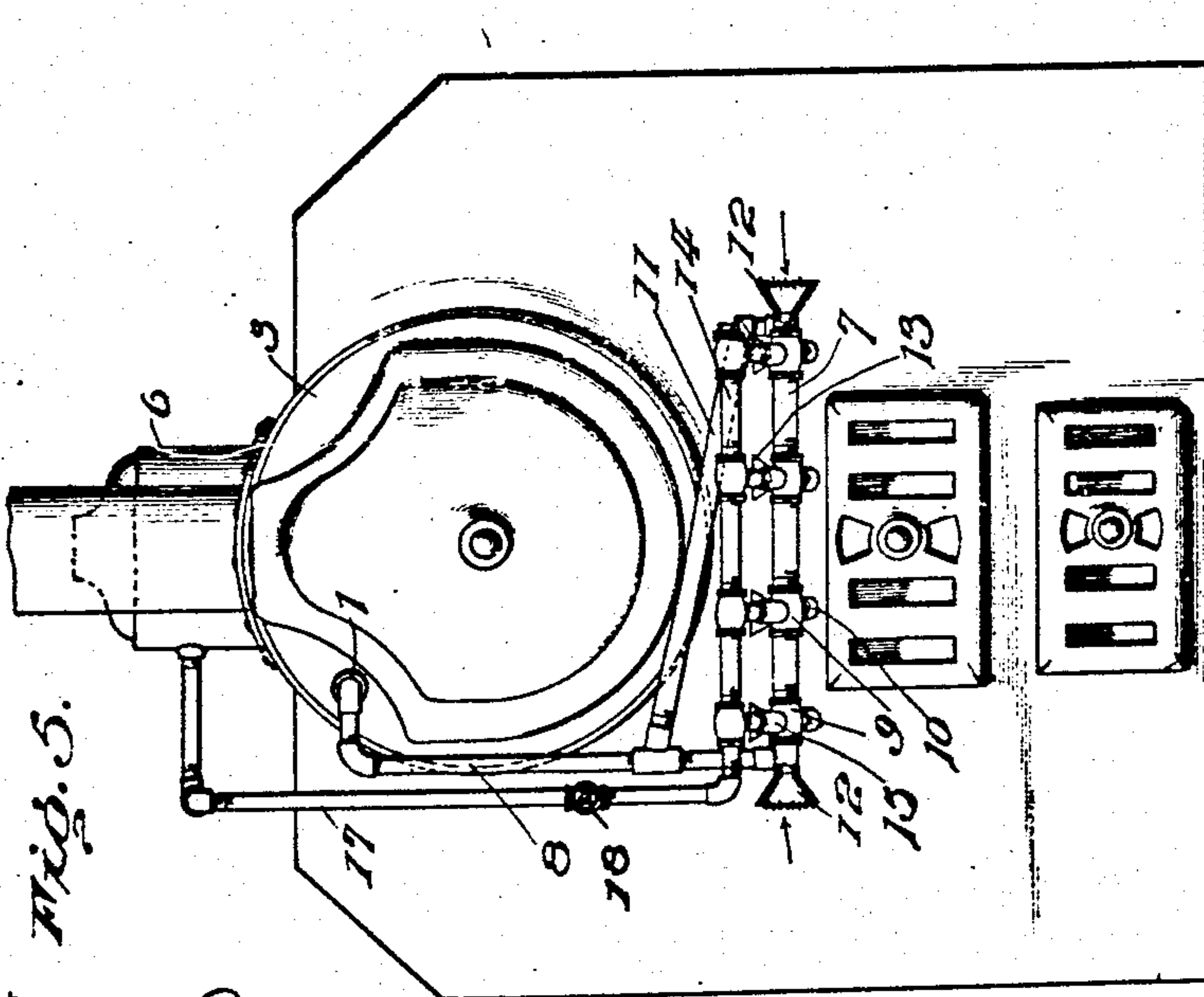


Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

LAWRENCE C. MOONEY, OF MONTGOMERY, ALABAMA, ASSIGNOR TO
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SMOKE-CONSUMING FURNACE.

SPECIFICATION forming part of Letters Patent No. 787,106, dated April 11, 1905.

Application filed December 22, 1903. Renewed October 26, 1904. Serial No. 230,109.

To all whom it may concern:

Be it known that I, LAWRENCE C. MOONEY, a citizen of the United States, residing at Montgomery, in the county of Montgomery and State of Alabama, have invented certain new and useful Improvements in Smoke-Consuming Furnaces, of which the following is a specification.

My invention has for its object to promote combustion in the consumption of fuel in the operation of steam-boiler furnaces of the various types, whether stationary, portable, or marine. As a result of perfecting the combustion my invention prevents the giving off of black smoke or free carbon and intensifies the heat, thereby economizing in the consumption of fuel and enabling a greater effective force of steam being derived from a given number of pounds or units of fuel.

My invention is adapted for all styles of steam-boiler furnaces of the various types, and in adapting the same for any particular make it is to be understood that various changes in the form, proportion, and minor details of construction may be resorted to without departing from or altering the nature of the invention.

In the drawings hereto attached and forming a part of the specification, Figure 1 is a vertical central longitudinal section of a steam-boiler furnace of the stationary type, illustrating the application of my invention. Fig. 2 is a view similar to Fig. 1, showing my invention applied to a steam-boiler furnace of the marine class. Fig. 3 is a view of a steam-boiler furnace of the portable or locomotive kind embodying my invention. Fig. 4 is a plan section on the line X X of Fig. 3. Fig. 5 is an end view of the steam-boiler furnace illustrated in Fig. 1. Fig. 6 is a vertical transverse section on the line Y Y of Fig. 1. Fig. 7 is a longitudinal section of one of the injectors on a larger scale, showing the same applied to the front wall of the style of furnace illustrated in Fig. 1. Fig. 8 is a detail perspective view of an end portion of the attachment.

Corresponding and like parts are referred

to in the following description and indicated in all the views of the drawings by the same reference characters.

My invention is substantially the same in structural details in its several applications to the various makes and types of steam-boiler furnaces, and a general description thereof will suffice for a clear understanding.

The air-pipe 1 for directing the supply of air into the combustion-chamber is arranged within the steam-space 2 of the boiler 3, whereby the air in transit to the point of consumption is heated to the proper degree, so as to promote consumption of the products of combustion by intensifying the flame without chilling the same, as would be the case if delivered upon the fire in a cool state. The supply-pipe 1 is provided at its receiving end with a funnel 4, which is protected by wire-gauze, so as to prevent cinders or other foreign matter from entering the pipe. It is to be understood that one or more pipes may be provided, as the exigencies of the case may require, in order to supply a sufficient quantity of air to insure perfect combustion. A chamber or compartment 5 is located in the length of the pipe 1 and is located within the steam-space of the boiler, preferably about opposite the steam-dome 6, so as to be subjected to the full action of the steam. This chamber or compartment 5 constitutes a reservoir and results in an increased surface for the action of the steam, so as to insure thorough and complete heating of the air to the temperature of the steam. I have discovered that the provision of the chamber 5 also acts as a storage and enhances the resultant advantages and insures a uniform and continuous delivery of hot air for commingling with the steam prior to delivery of the mixture into the combustion-chamber.

In adapting my invention to a steam-boiler furnace I arrange a header 7 in front of the furnace and as close thereto as possible and connect the same at one end with a branch pipe 8, having communication with the front end of the supply-pipe 1. The header 7 is composed of a series of short lengths of pipe

and fittings 9, the latter being approximately of T form. A series of pipes 10 connect the header 7 with the front wall of the furnace and are arranged at a downward inclination toward their delivery end, so as to direct the blast upon the fire at the inner rear end, so as to strike the bridge wall or baffle, whereby an eddying current is created, as indicated by the arrows in Figs. 1, 2, and 3, whereby a thorough intermixture of the smoke-consuming blast and the products of combustion is assured. In order to equalize the supply of hot air to opposite ends of the header 7, the pipe 11 is employed and connects the end of said header remote from the pipe 8 with the latter at a point above the connection of said pipe 8 with the header 7, as indicated most clearly in Fig. 5.

The header 7 is preferably provided at opposite ends with funnels 12 and at intermediate points with funnels 13, said funnels being protected at their open ends by wire-gauze to preclude the entrance of foreign matter, which would have a tendency to choke the passages. The several funnels 12 and 13 constitute supplemental air-inlets and are disposed so that the air entering therethrough is compelled to intermingle with the hot air and steam prior to delivery into the combustion-chamber. Within the purview of the invention I contemplate to dispense with either one or both sets of funnels 12 and 13.

Parallel with and adjacent to the header 7 I arrange a corresponding header 14, the same being similar in construction to the header 7—that is, composed of short lengths of pipe and T-fittings. Short pipes 15 connect the headers 7 and 14 and terminate in nozzles 16, which project across the header 7 and enter the pipes 10, so as to deliver a jet through the pipes 10 and create a suction in the header 7 and supply-pipe 1, whereby the air is drawn into and through said pipe and also through the funnels or inlets 12 and 13. The air in its passage through the pipe 1 is quickly raised to the temperature of the steam and commingles with the steam from the nozzles 16 in the pipes 10 prior to delivery into the combustion-chamber. The header 14 is connected with any source of steam-supply and, as shown, is connected with the steam-dome 6 of the boiler by the pipe 17, which is provided with a controlling-valve 18. Obviously the steam-pipe 17 may communicate with the steam-space of the boiler at any convenient point. While I have shown one pipe only, nevertheless I contemplate one or more should the same be necessary in order to supply steam to the header 14 at more than one point.

In the type of steam-boiler furnace illustrated in Fig. 1 the pipe 1 has its receiving portion extended across the smoke-space 19, whereas Figs. 3 and 4 show a coil 20 arranged in the smoke-space and included in the length of the pipe 1. In the style of steam-boiler

furnace shown in Fig. 2 I have illustrated the pipe 1 extended through the steam-space of the boiler only. The disposition of the pipes 10 will depend largely upon the make and type of furnace, and it is not necessary in all cases that said pipes be downwardly inclined. In Fig. 3 I have shown the pipes 10 horizontal, so as to deliver the blast against the baffle 21, which accomplishes the same result as having the pipes arranged to deliver the blast against the arch or fire-wall, as indicated in Figs. 1 and 2.

The chamber 5 provides a means for supplying a quantity of heated air and affords an exposure of a greater area of air to the action of the heat within the boiler than does a corresponding length of the pipe supplying said chamber. Therefore, of course, it is desirable to have the chamber 5 disposed at a point wherein the same will be subjected to the action of the greatest amount of heat, and I have for this purpose arranged the same beneath the steam-dome in order that the moving steam occasioned by discharge from the dome will be caused to contact with said chamber 5. Of course if the steam-dome were omitted and steam drawn from the boiler directly the heating action of the steam would be the same and the spirit of the invention involved, so long as the chamber is disposed in the line of discharge of steam from the boiler.

Having thus described the invention, what I claim as new is—

1. In a steam-boiler furnace, the combination of a pipe extended through the steam-space of the boiler and adapted to receive a supply of air at one end and to deliver said air in heated condition into the combustion-chamber for promoting combustion, and a chamber in the length of said pipe located opposite to the steam-dome of the boiler and within the steam-space, substantially as set forth.

2. In a steam-boiler furnace, the combination of a header having terminal and intermediate air-inlets, means connecting said header at points in its length with the combustion-chamber of the furnace, an air-pipe extended through the steam-space of the boiler and connected to said header, a companion header, means for supplying steam or blast medium thereto, and nozzles connecting the two headers and projected across the intermediate air-inlets of the header having direct connection with the steam-boiler furnace, substantially as specified.

3. In a boiler-furnace, the combination with a boiler having a steam-dome and a fire-box beneath the same, of an air-supply pipe extending through the steam-space of said boiler and discharging into said fire-box, and a chamber interposed in the length of said supply-pipe and disposed within the steam-space of the boiler beneath the steam-dome thereof.

4. In a boiler-furnace, the combination with

a boiler and a fire-box beneath the same, of an air-supply pipe extending through the steam-space of said boiler and discharging into said fire-box, and a chamber interposed in the
5 length of said pipe and disposed within the steam-space of the boiler beneath the point of discharge of steam from said boiler.

5. In a boiler-furnace, the combination with
a boiler and a fire-box beneath the same, of an
10 air-supply pipe extending through said boiler

and discharging into said fire-box, and a chamber interposed in the length of said pipe and disposed in the line of discharge of steam from the boiler.

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

LAWRENCE C. MOONEY. [L. s.]

Witnesses:

GENEVIEVE MATTHEWS,
EMILY H. ENGLAND.