No. 820,054. PATENTED MAY 8, 1906.

L. B. LENT.

STEAM BOILER.

APPLICATION FILED JULY 8, 1905.

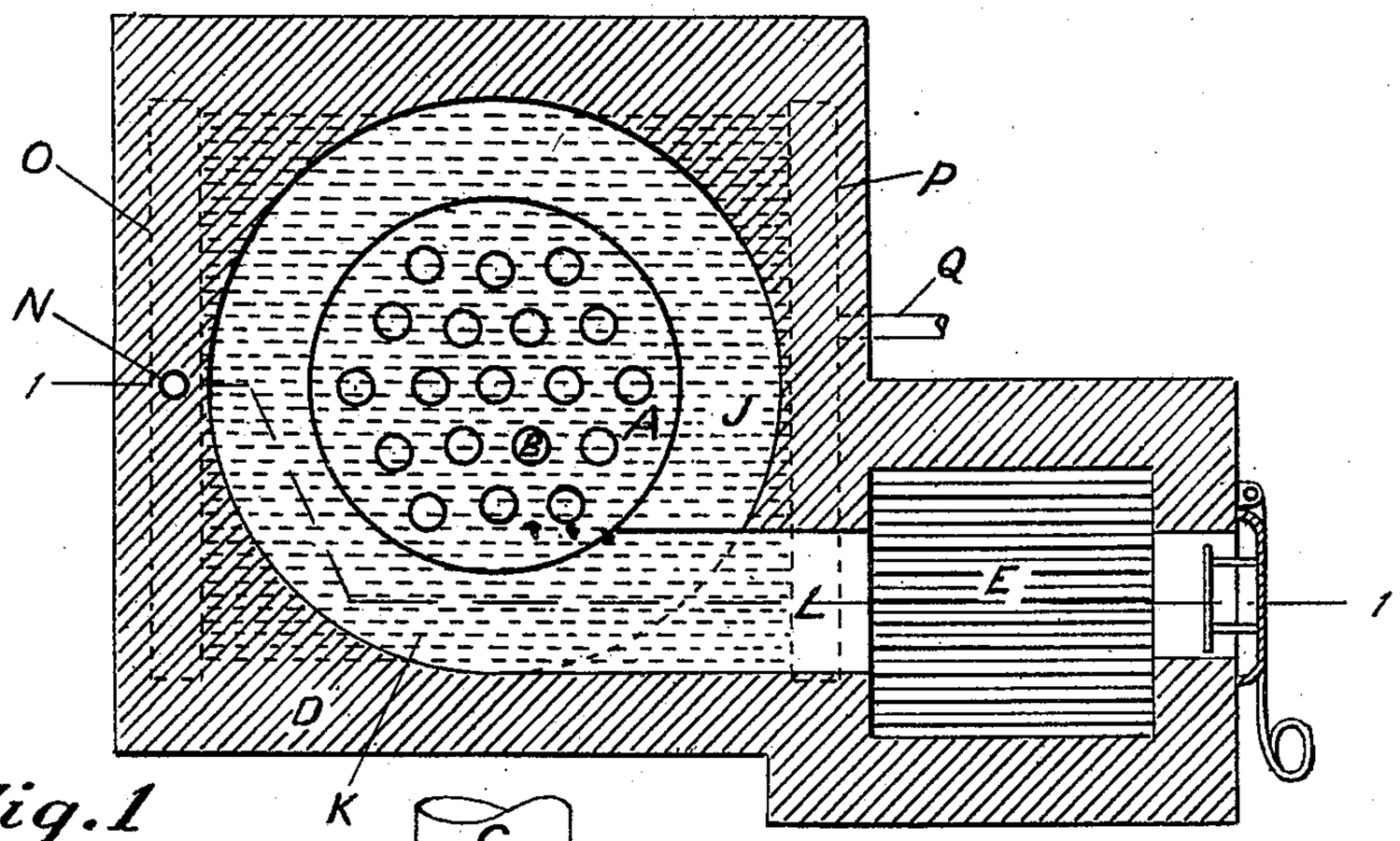

Fig. 1

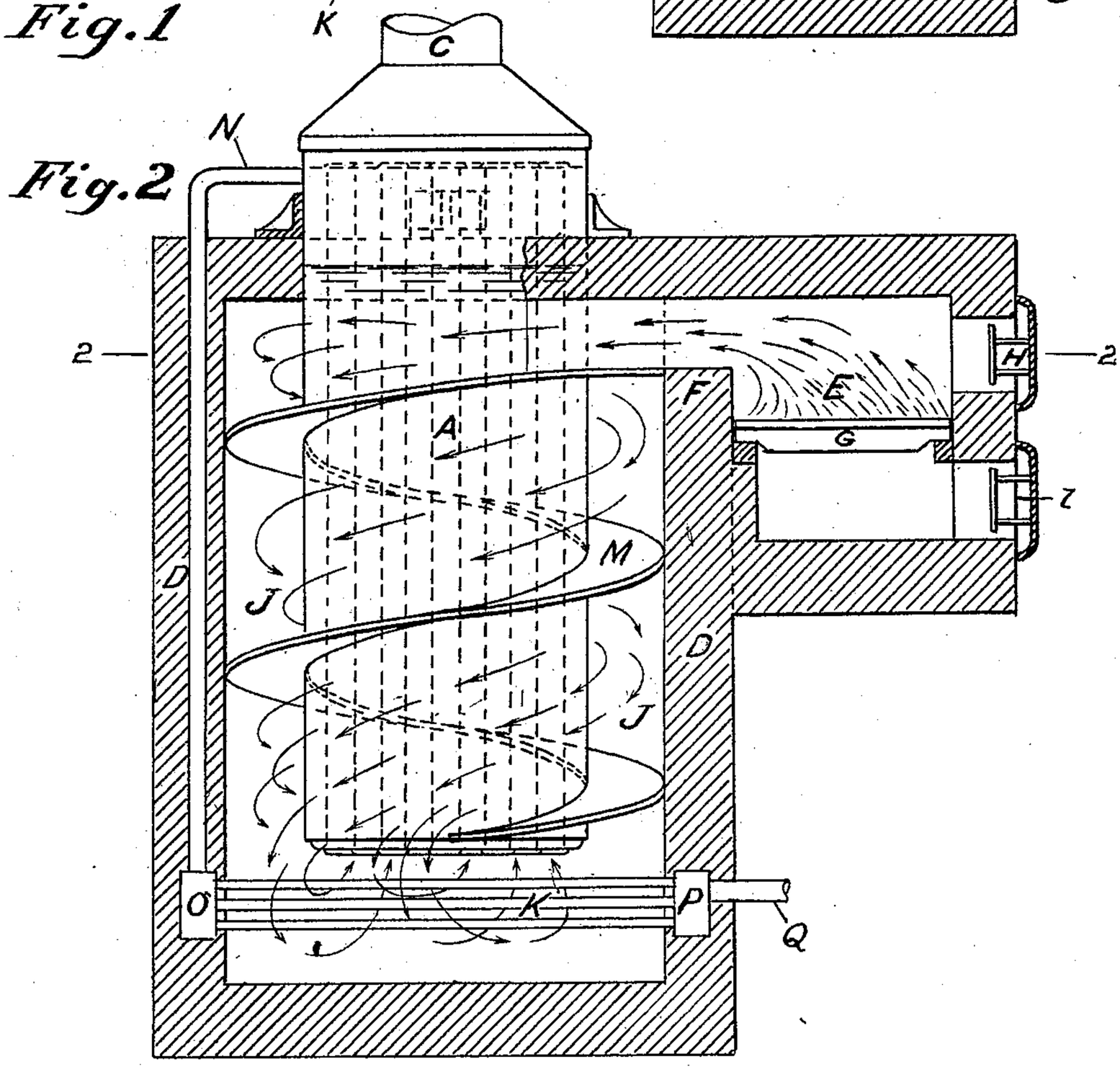

Fig. 2

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STEAM-BOILER.

No. 820,054. Specification of Letters Patent. Patented May 8, 1906.

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To all whom it may concern:

Be it known that I, LEON BREWSTER LENT, a citizen of the United States, residing at Brewster, in the county of Putnam and State of New York, have invented a new and useful Improvement in Steam-Boilers, of which the following is a specification.

My invention relates to improvements in steam-boilers, and the object thereof is to produce a simple and compact structure easily built, having an unusually large amount of heating-surface for its size, and means whereby the furnace-gases are kept long in contact with the heating-surface, thereby producing a greater heating effect and a fuller utilization of the heat of the fuel without a corresponding decrease in the chimney-draft. I accomplish these objects by placing the furnace or throat to one side of the longitudinal axis of the boiler, thereby causing the furnace-gases to pass in a tangential whirl about the outer surface of the boiler and then an upward course through the tubes or flues inside of the boiler to the smoke-pipe.

In the accompanying drawings, forming part of this specification, Figure 1 represents a horizontal section along line 2 2 of Fig. 2, and Fig. 2 represents a vertical section along line 1 1 of Fig. 1.

The same letters of reference represent the same parts in both figures.

A is a boiler, preferably vertical, which is provided with tubes or flues B and the smoke-stack C. The boiler is surrounded by a furnace-casing D, the furnace E being near the upper part of the boiler and provided with the usual bridge-wall F, grate G, fire-door H, and ash-pit door I.

The throat L or connection between the furnace E and annular space J, surrounding the boiler, is preferably contracted at its sides and placed tangential to the boiling-shell to increase the velocity of the escaping gases and cause them to take a circular and downward path, whirling a number of times about the outer heating-surface of the boiler before passing upward through the tubes or flues B, as indicated by the arrows in Fig. 2.

Although the furnace-gases will naturally whirl about the exterior of the boiler in a helical course, to make this action more certain I preferably employ an imperforate helical septum M in the space J, which acts as a guide for the gases.

The steam preferably is led from the steam-space of the boiler by means of the pipe N, passing downwardly to a header O, through a series of pipes K, forming a superheater, to a corresponding header P, and thence through the main steam-pipe Q.

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

1. The combination of a boiler and a furnace therefor, located near one end thereof and to one side of the longitudinal axis of the boiler, and a casing surrounding the boiler forming a chamber connected with said furnace whereby the gases pass in a tangential whirl through the chamber and about the boiler, substantially as described.

2. The combination of a boiler provided with flues, a casing forming a chamber about the boiler, a furnace located near one end of the boiler, to one side of the longitudinal axis thereof and communicating with said chamber, whereby the furnace-gases are forced to travel in a tangential whirl or helix about the exterior of the boiler and then through the flues or tubes, substantially as described.

3. The combination of a boiler, a casing surrounding the same and forming a chamber, a furnace, a passage connecting the furnace with the chamber near one end, tangentially, whereby the furnace-gases are forced to take a helical course about the boiler and through said chamber, substantially as described.

4. The combination of a vertical tubular boiler, a casing surrounding same, and a furnace communicating tangentially with said chamber near the upper end thereof, whereby the furnace-gases are caused to take a helical downward course about the boiler and through said chamber before passing upwardly through the boiler-tubes, substantially as described.

5. The combination of a boiler and a furnace therefor located near one end thereof and to one side of its longitudinal axis, a casing surrounding the boiler and leaving an intervening space, a helical septum in said space, said space communicating with the furnace, whereby the furnace-gases are forced to pass about the boiler in a helical path, substantially as described.

6. The combination of a boiler provided with flues, a casing forming a chamber about the boiler, a helical septum in said chamber, a furnace located near one end of the boiler and to one side of the longitudinal axis there-

of and communicating with said chamber, whereby the gases are forced to pass about the boiler in a helical path and then through the tubes, substantially as described.

7. The combination of a boiler, a casing surrounding the same and forming a chamber, a furnace, a passage connecting the furnace with the chamber near one end tangentially, and a helical septum in said chamber whereby the gases are forced to take a helical path about the boiler, substantially as described.

8. The combination of a vertical tubular boiler, a casing surrounding same and forming a chamber, a furnace communicating tangentially with the upper end of said chamber and a helical septum in said chamber whereby the gases are forced to take a helical, downward course about the boiler and then pass upward through the tubes of the boiler to the smoke-stack, substantially as described.

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