

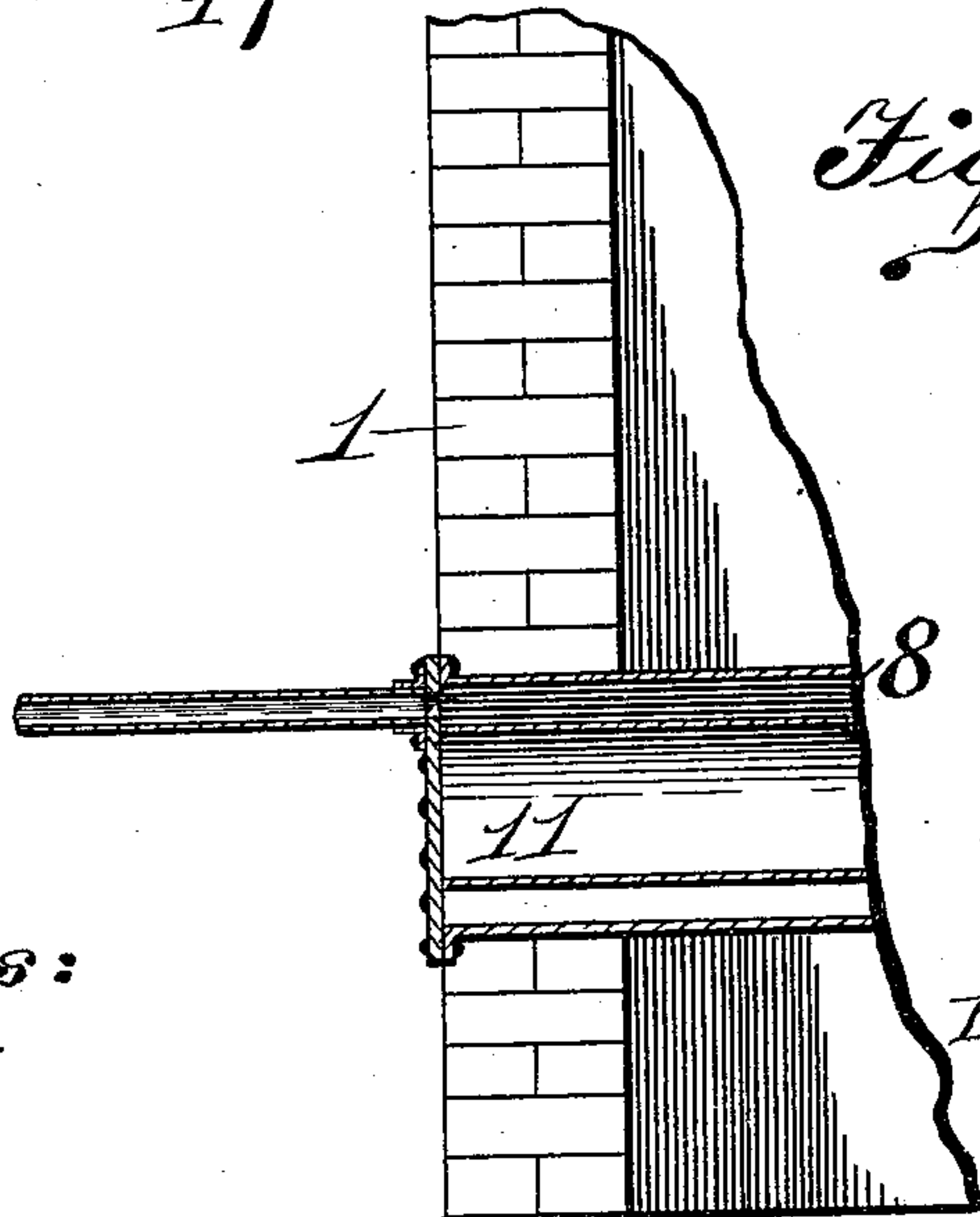
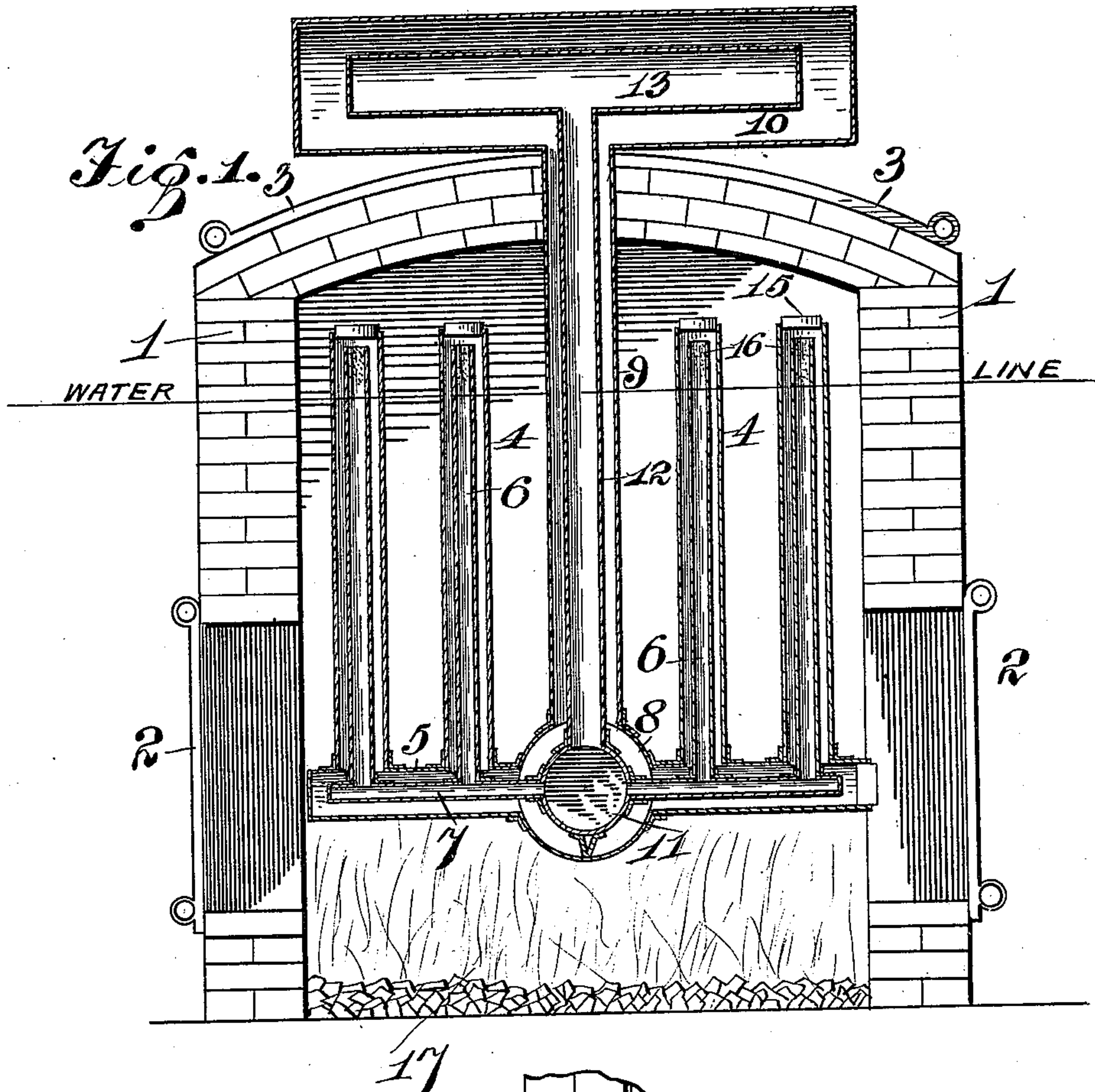
(No Model.)

2 Sheets—Sheet 1.

G. GILFORD.
BOILER.

No. 564,308.

Patented July 21, 1896.



Witnesses:
H. Lewis
M. Richards

Inventor:
By *George Gilford*
O. D. Lewis
Atty

(No Model.)

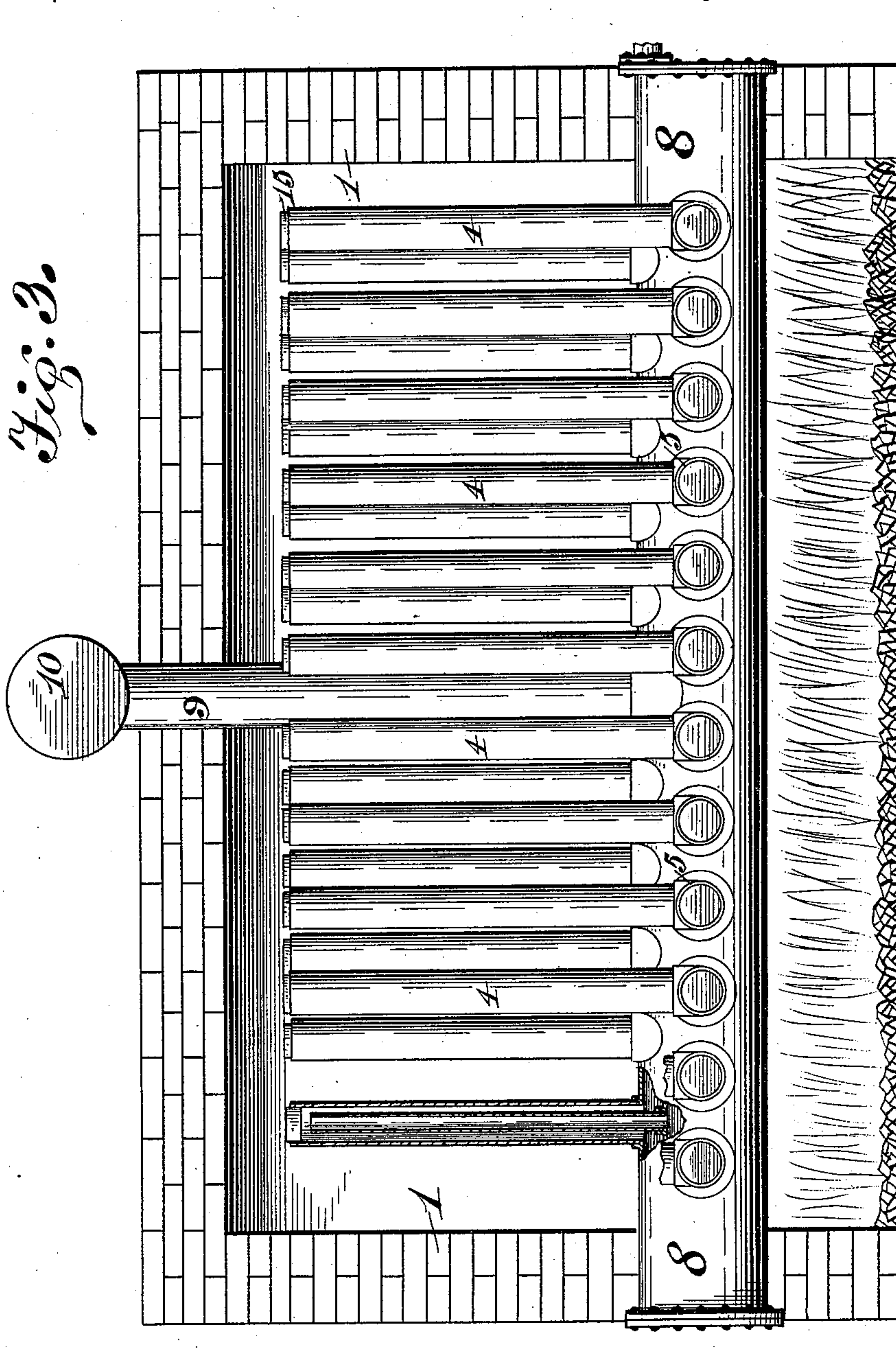
2 Sheets—Sheet 2.

G. GILFORD.
BOILER.

No. 564,308.

Patented July 21, 1896.

Fig. 3.



Witnesses:
H. Lewis
W. Richards

Inventor:
George Gilford
By O. D. Lewis

Atty.

UNITED STATES PATENT OFFICE.

GEORGE GILFORD, OF ALLEGHENY, PENNSYLVANIA.

BOILER.

SPECIFICATION forming part of Letters Patent No. 564,308, dated July 21, 1896.

Application filed December 11, 1895. Serial No. 571,821. (No model.)

To all whom it may concern:

Be it known that I, GEORGE GILFORD, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Boilers; and I do 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, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to certain new and useful improvements in boilers, and relates particularly to that class known as "tubular" boilers.

The invention has for its object the provision of new and novel means whereby a boiler of the above-described class may be constructed that will possess numerous advantages over those now in use; furthermore, a boiler of this class that will permit of a greater degree of dry steam being obtained than ordinarily.

A further object of the invention is the construction of a tubular boiler that will be simple in its construction, strong, durable, effectual in its operation, and comparatively inexpensive to manufacture.

With the above and other objects in view the invention finally consists in the novel construction, combination, and arrangement of parts, to be hereinafter more specifically described, and particularly pointed out in the claims.

In describing the invention in detail reference is had to the accompanying drawings, forming a part of this specification, and wherein like letters of reference indicate similar parts throughout the several views, in which—

Figure 1 is a vertical sectional view of my improved boiler. Fig. 2 is a transverse vertical sectional view of the cylinder. Fig. 3 is a side view partly in section.

In the drawings, 1 indicates the wall inclosing the boiler, 2 2 doors arranged in the side of the wall, and 3 3 doors arranged on the top of the same.

Pipes 4 4 4 4 are arranged in an upright position and connected at the lower ends to pipes 5. Pipes 6 6 6 6 are arranged in the inside of pipes 4 4 4 4 and connected at their lower ends to pipes 7 7 7 7 in the inside of pipes 5. The pipes 5 are connected at their inner end to a cylinder 8, carrying on its upper portion pipes 9 9 9 9, leading to the steam-drum 10, and the pipes 7 7 are secured to a cylinder 11 on the inside of the cylinder 8, and carries on its upper portion pipes 12, leading to a steam-drum 13, arranged inside of the steam-drum 10. The cylinder 11 is provided with a brace 14 on its underneath side, which rests on the cylinder 8, thereby serving to help retain the cylinder 11 in position. The top of the pipes 4 4 4 4 are provided with removable plugs 15, and the pipes 6 6 6 6 are apertured near their top, as shown at 16 in Fig. 1 of the drawings.

The reference-figure 17 represents the grate, showing the fire in under the boiler.

The operation of the boiler is as follows: The water is admitted to the boiler through the pipes 5, as shown in Fig. 2 of the drawings, to the pipes 4 and cylinder 8. The steam-pipes 6 6 6 6, arranged in the interior of the pipes 4 4 4 4, being apertured as shown at 16, will receive the steam through the said apertures and carry the same through the pipes 7 7, the cylinder 11, and the pipes 12 to the inner steam-chest 13, the pipes 9 9 leading from the cylinder 8 carrying the steam to the outer steam-chest 10. It will be noted that the water-line being below the apertures in the pipes 6 6 6 6, the steam will readily course through the apertures and pipes leading to the steam-chest, leaving a dry steam in the chest at all times. It will be readily observed that by this arrangement of double tubes one within the other a much dryer steam can be obtained than by the ordinary method, which is a very important factor.

The arrangement of the doors are such that access is readily had to all parts of the boiler should the same need repairing at any portion thereof.

It will be noted that various changes may be made in the details of construction of my improved tubular boiler without departing from the general spirit of my invention.

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

1. In a tubular boiler, a series of upright
5 pipes having removable plugs at their top,
and connected at the base by a series of pipes
to a cylinder, and having inner pipes perforated near their top and secured at the lower
10 end by pipes to a steam-cylinder, substantially as shown and described.

2. In a tubular boiler, a water-cylinder having connecting-pipes carrying upright pipes having removable plugs, and a pipe leading to the steam-chest arranged above the cylinder, substantially as shown and described.
15

3. In a tubular boiler, a series of pipes connected to a water-cylinder at their base, and having inner pipes adapted to receive the steam said inner pipes being perforated near
20 their top and connected at the base by pipes

to a steam-cylinder arranged on the inside of the water-cylinder, substantially as shown and described.

4. A tubular boiler consisting of a series of upright pipes having removable plugs, and
25 inner pipes perforated near the top, said upright pipes being connected to a water-cylinder and the inner pipes to a steam-cylinder by pipes at their base, said water-cylinder having an upright pipe leading to a steam-
30 chest, and the steam-cylinder provided with an upright pipe leading to an inner steam-cylinder, substantially as shown and described.

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

GEORGE GILFORD.

Witnesses:

CHAS. F. RANKIN,
G. W. RANKIN.