

(No Model.)

A. H. B. SHARPE & F. PALMER.

VERTICAL STEAM BOILER.

No. 283,672.

Patented Aug. 21, 1883.

FIG. 1.

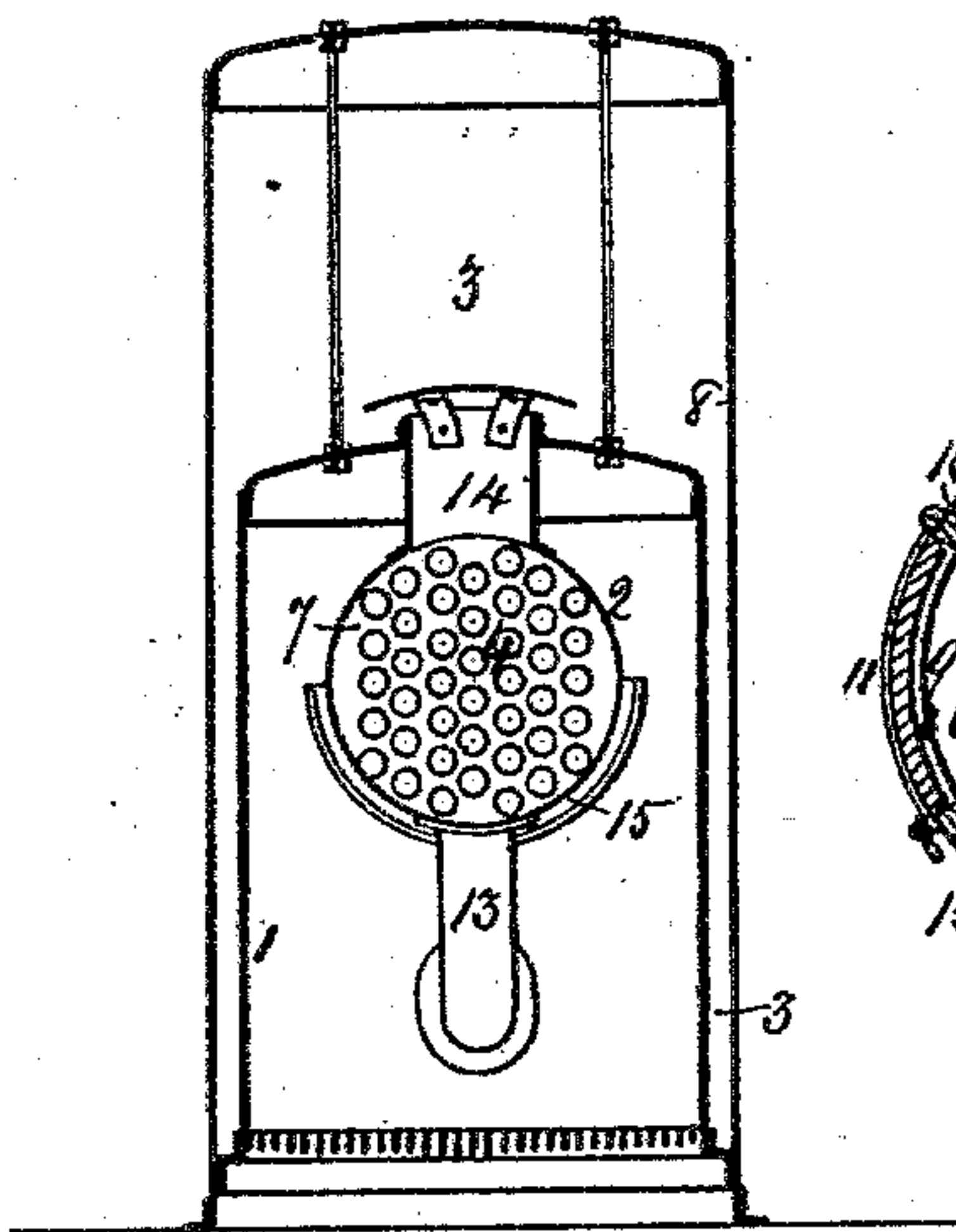


FIG. 2.

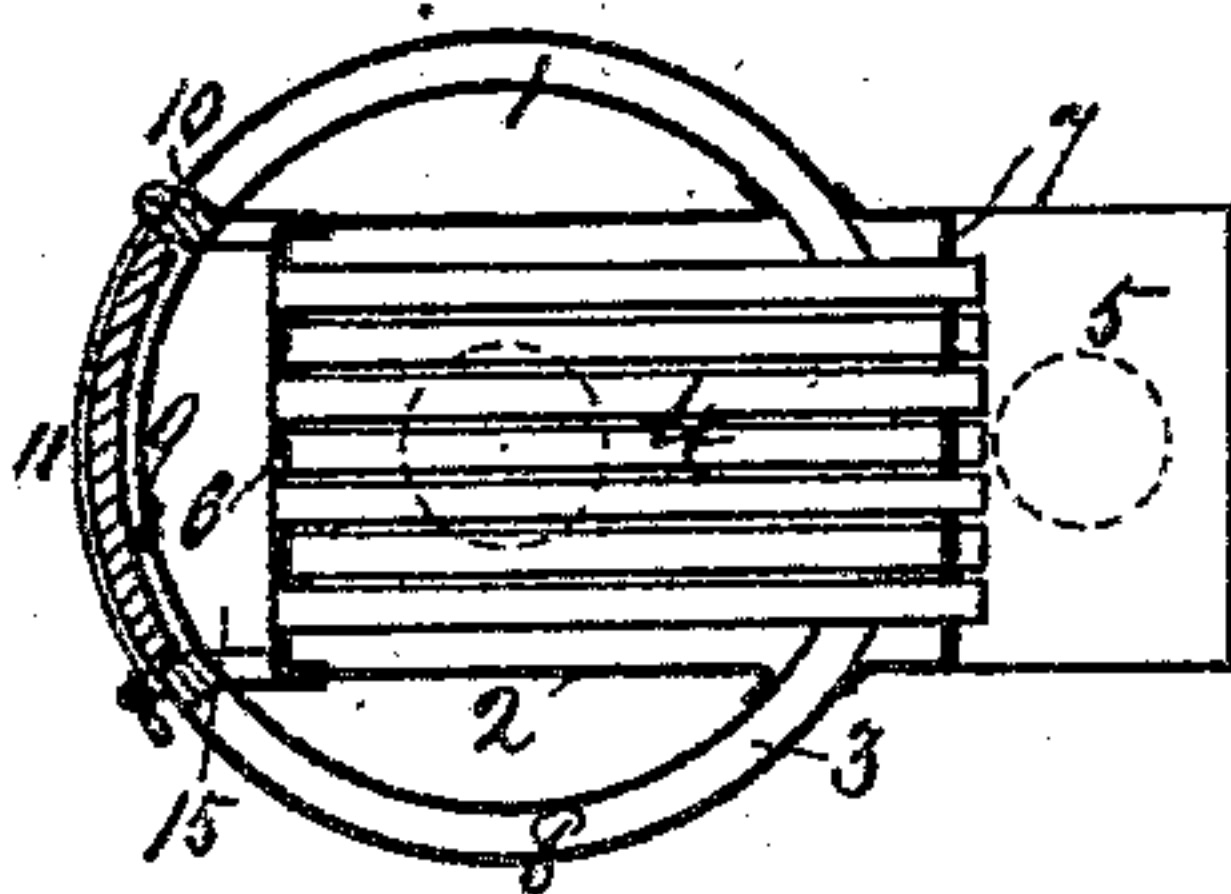


FIG. 3.

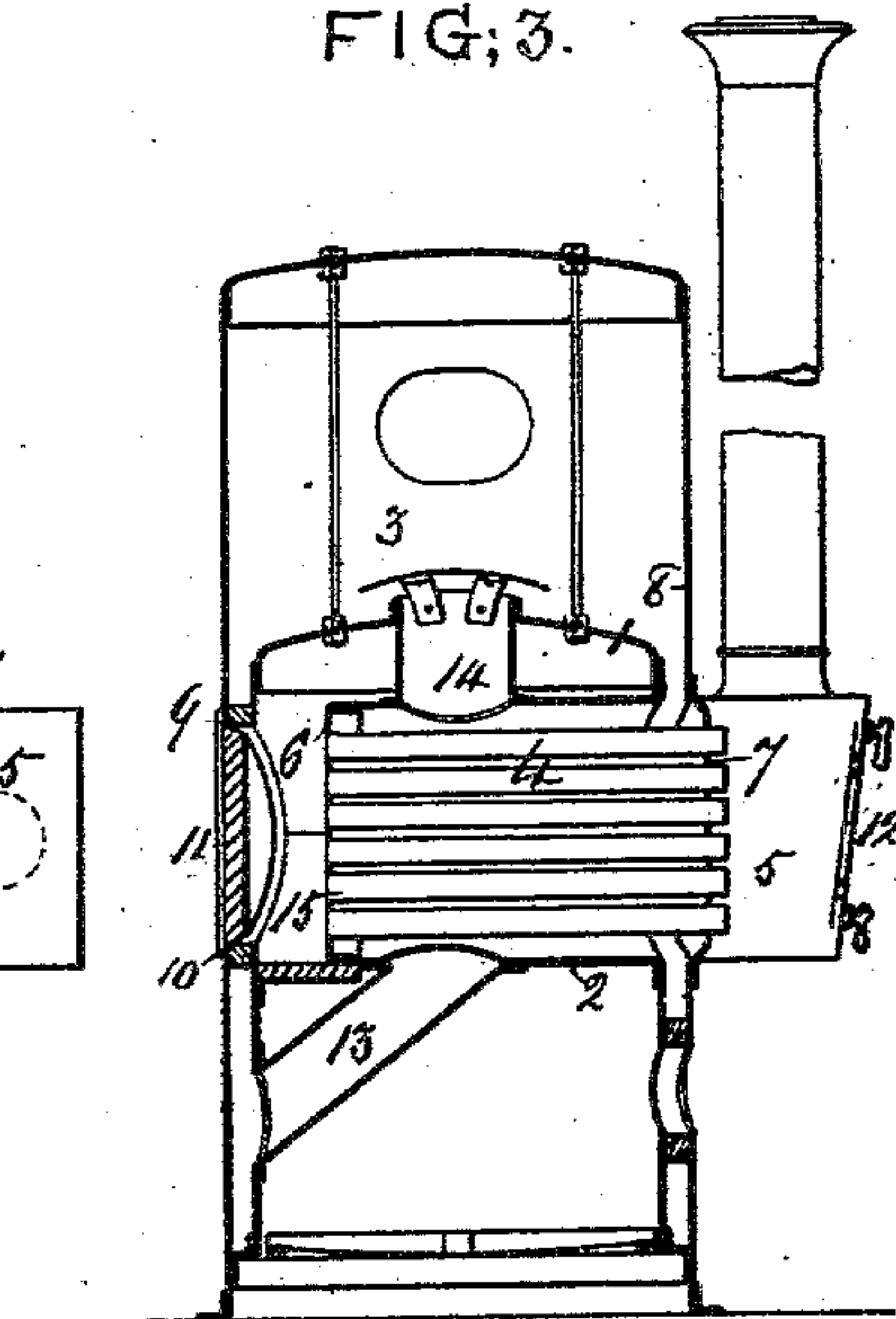


FIG. 6.

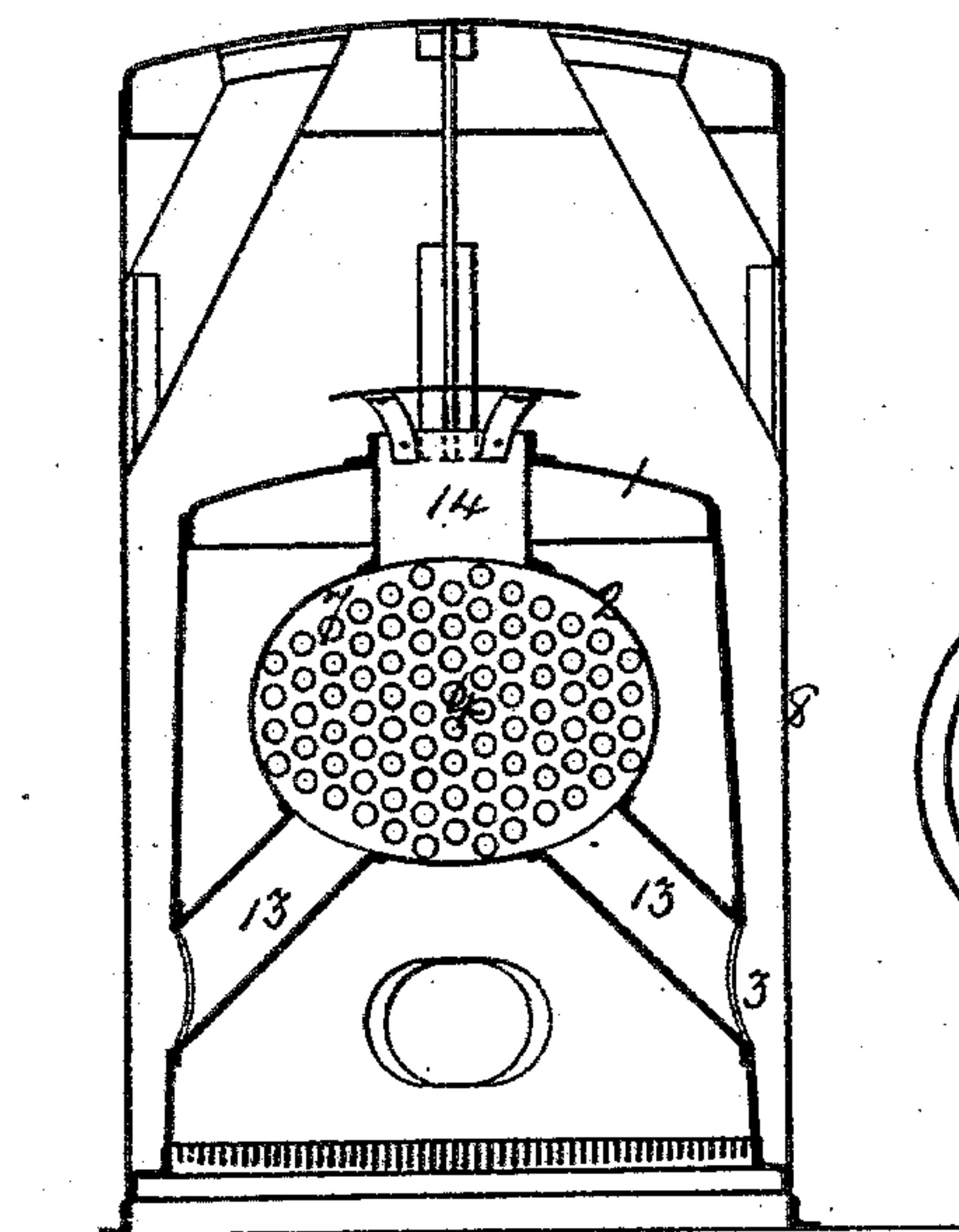


FIG. 4.

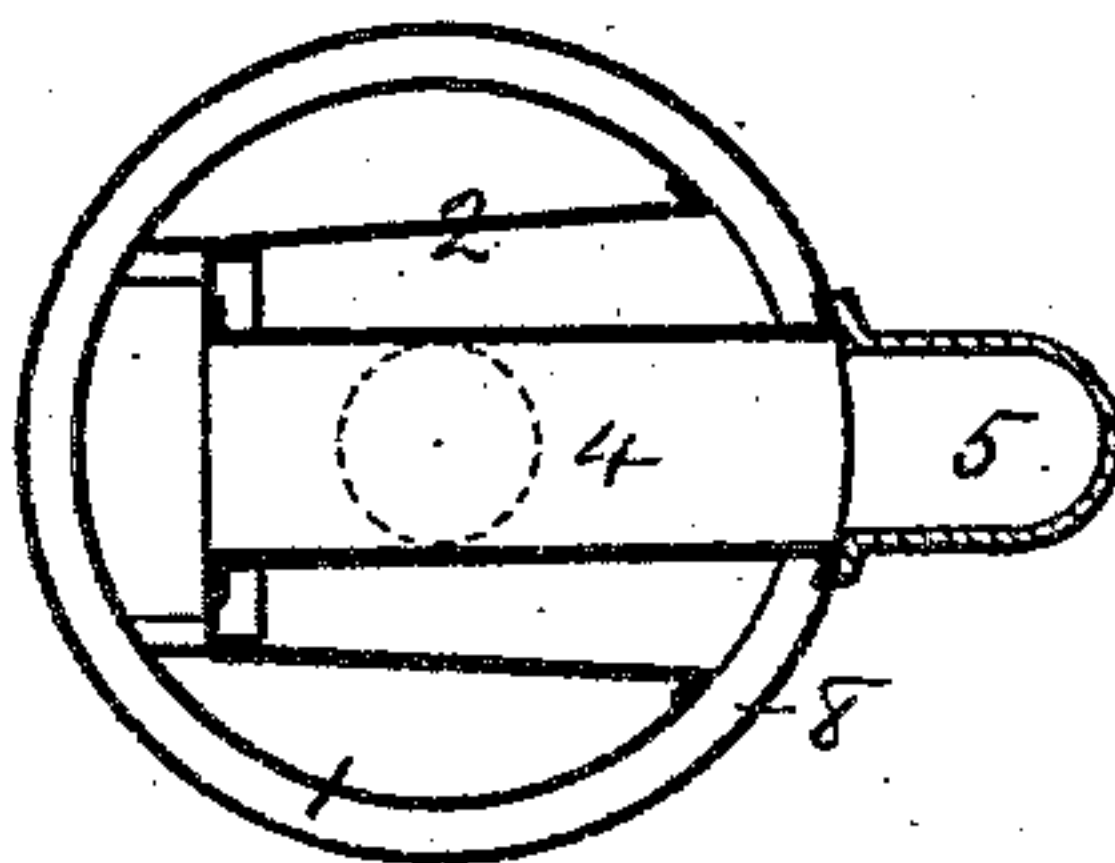
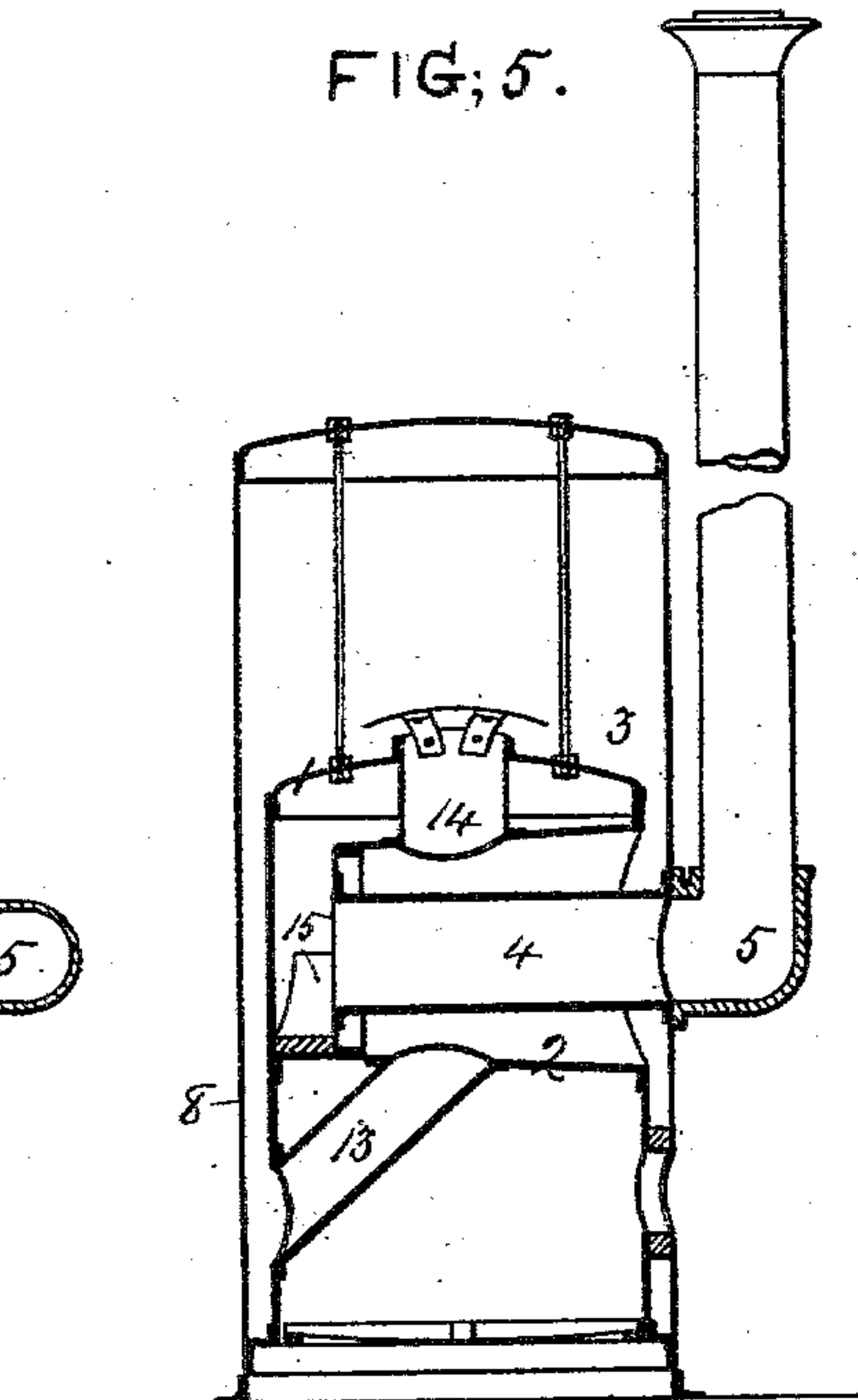


FIG. 5.



Witnesses
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UNITED STATES PATENT OFFICE.

ALFRED HORATIO BELL SHARPE AND FREDERICK PALMER, OF LINCOLN,
COUNTY OF LINCOLN, ENGLAND.

VERTICAL STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 283,672, dated August 21, 1883.

Application filed June 18, 1883. (No model.) Patented in England December 14, 1882, No. 5,968.

To all whom it may concern:

Be it known that we, ALFRED HORATIO BELL SHARPE, draftsman, and FREDERICK PALMER, engine-driver, both of Lincoln, in the county of Lincoln, England, subjects of the Queen of Great Britain and Ireland, have invented certain Improvements in Vertical Steam-Boilers, of which the following is a specification.

10 This invention relates to improvements in vertical steam-boilers; and its primary objects are to insure an efficient circulation of the water therein and an advantageous utilization of the furnace heat.

15 The invention consists in combining with and fixing within the fire-box of vertical steam-boilers a transverse horizontal water-vessel, which is in communication with the water-space surrounding and above the fire-box, and has passing throughout its length one or more fire-flues, or a series of horizontal fire-tubes, which lead from within the fire-box to a smoke-box and chimney situated at one side of the shell of the boiler.

25 The invention is illustrated on the accompanying drawings in Figures 1 to 6, which will be hereinafter more particularly referred to.

1 represents the fire-box; 2, the transverse water-vessel; 3, the water-space surrounding and above the fire-box; 4, the through fire tubes or flues, and 5, the smoke-box and chimney. The length of the water-vessel 2 is made less than the inside diameter of the fire-box 1, and one of its ends is made of a tube-plate, 6. Its other end is left open, and is riveted to the fire-box shell. Opposite the open end of the water-vessel another tube-plate, 7, is riveted on the outside of the boiler-shell 8, so as to be parallel with the tube-plate 6. The tube-plates 6 and 7 are connected by horizontal fire flues or tubes 4, which pass longitudinally through the water-vessel. When the communication between the fire-box and the smoke-box and chimney consists of a series of fire-tubes, as in Figs. 1 to 3 and 6, immediately opposite the tube-plate 6 there is formed an aperture, 9, by cutting away opposite portions of the plates of the fire-box and boiler-shells, and riveting

the cut edges of the plates with a solid or other iron ring, 10, between them, and the aperture thus formed is fitted with a door, 11, lined with fire-brick or other refractory material. The exit ends of the fire-tubes open into a smoke-box, 5, which covers the tube-plate 7, and the smoke-box is formed with a door, 12, which is opposite the door 11. By means of the doors 11 and 12 the tubes 4 can be easily inspected and cleaned when necessary.

In Figs. 4 and 5 the provision of the doors is not shown, and the outer end of a fire-flue is riveted directly to the boiler-shell, and the chimney leads direct from the flue instead of from the smoke-box, as in the other figures.

The lower part of the water-vessel 2 is connected with the water-space surrounding the fire-box by means of one or more T-shaped or inclined water-tubes, 13. These tubes may be in the same plane as the water-vessel, as represented in Figs. 1 to 5, or in a plane at right angles thereto, as represented in Fig. 6. The upper part of the water-vessel is connected with the water-space, above the crown of the fire-box, by means of a circular or elliptical water-tube, 14. By this connection of the water-vessel with the water-space surrounding and above the fire-box, there is insured a continuous efficient circulation of the water in such space and within the said vessel and round and about the fire tubes or flues. A fire-brick baffle, 15, is arranged round the lower half of the space between the end 6 of the water-vessel and the adjacent side of the fire-box, so as to compel the heated gases to envelop the water-vessel and impinge against the fire-box crown before passing through the tubes or flues into the smoke-box and chimney.

The water-vessel may be of a cylindrical, conical, elliptical, or other such shape. In Figs. 1 to 3 it is shown as of a cylindrical shape, in Figs. 4 and 5 as of a conical shape, and in Fig. 6 as of an elliptical shape.

We claim as our invention—

In vertical steam-boilers, the combination, with a vertical fire-box, of a transverse horizontal water-vessel provided with lower and

upper extensions, in communication with the water-space surrounding and above the fire-box, and traversed by one or more fire-flues or by a series of fire-tubes leading from within
5 the fire-box to an external smoke-box and chimney, substantially as hereinbefore described with reference to the accompanying drawings.

In testimony whereof we have signed our

names to this specification in the presence of two subscribing witnesses.

ALFRED HORATIO BELL SHARPE.
FREDERICK PALMER.

Witnesses:

ED. B. GEORGE,

WM. DEAN,

Clerks to Mr. Swan, Notary, Lincoln.