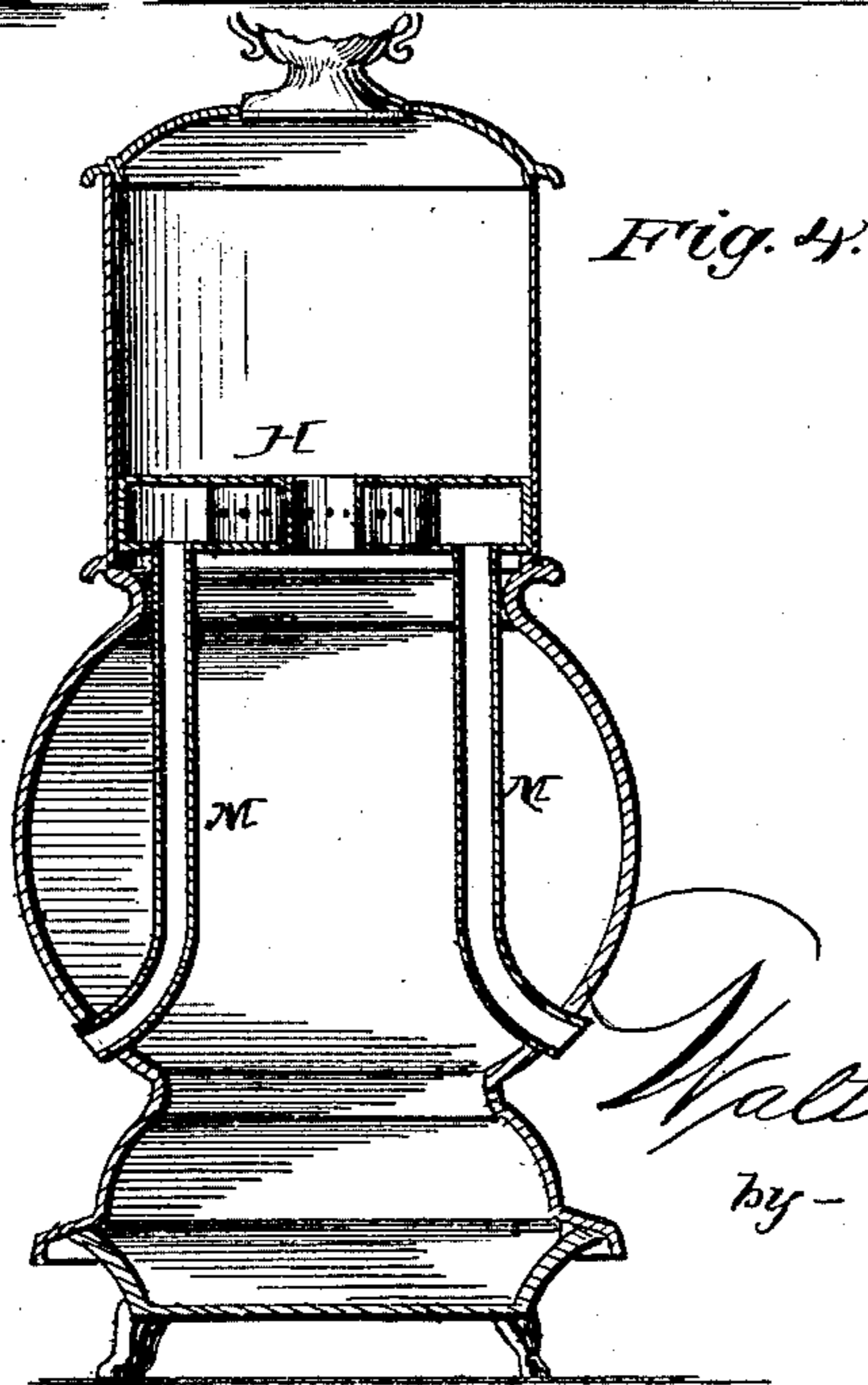
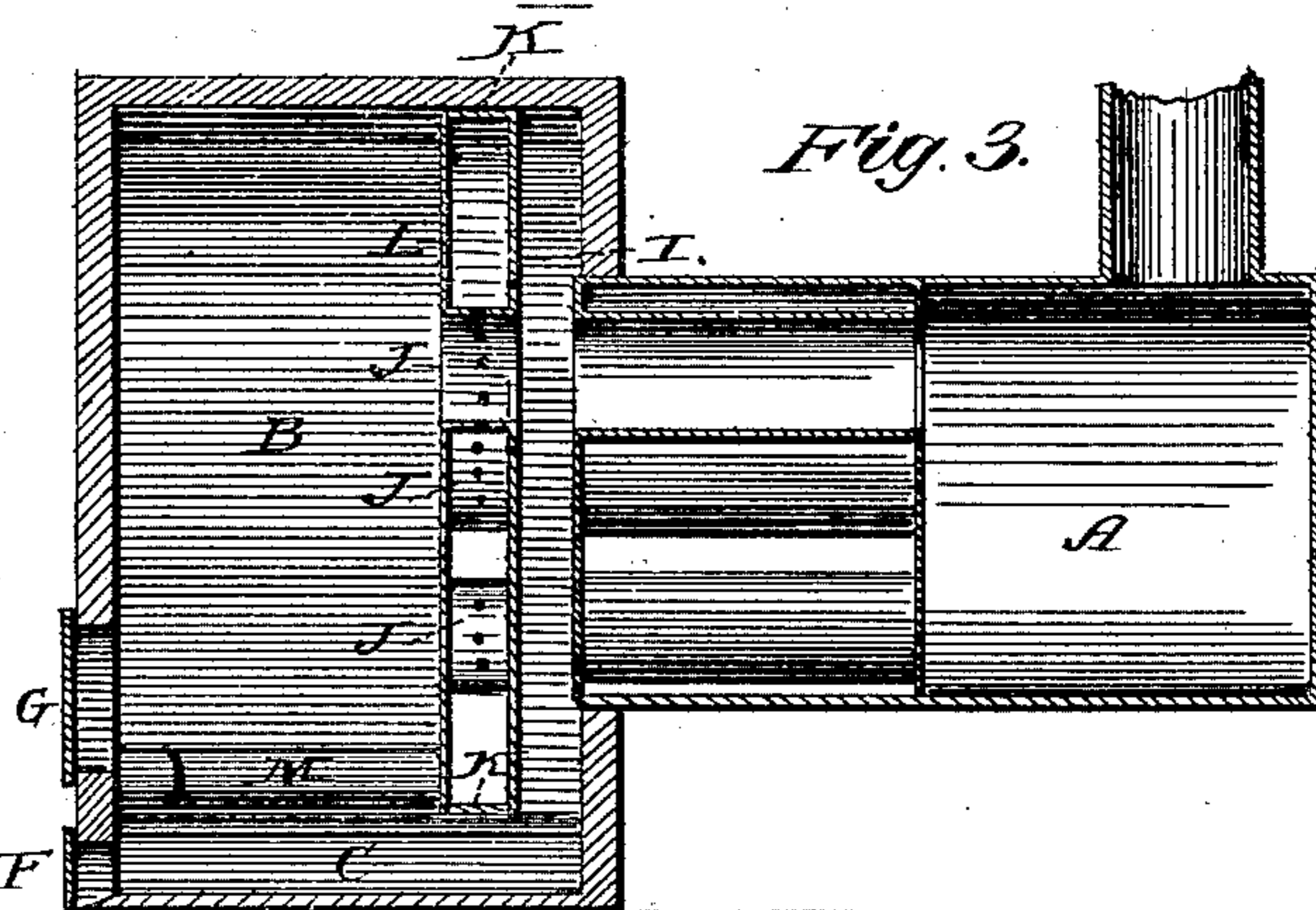
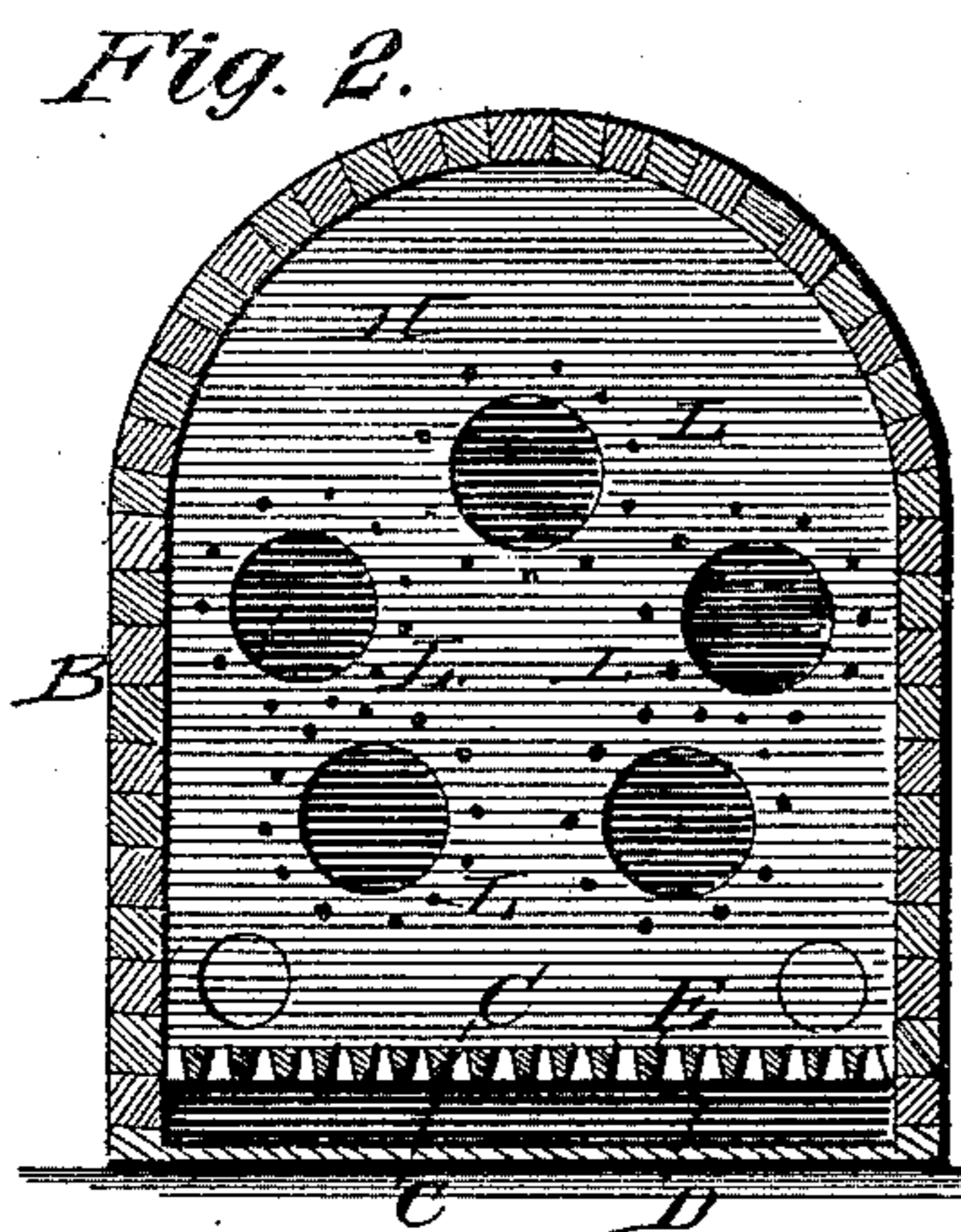
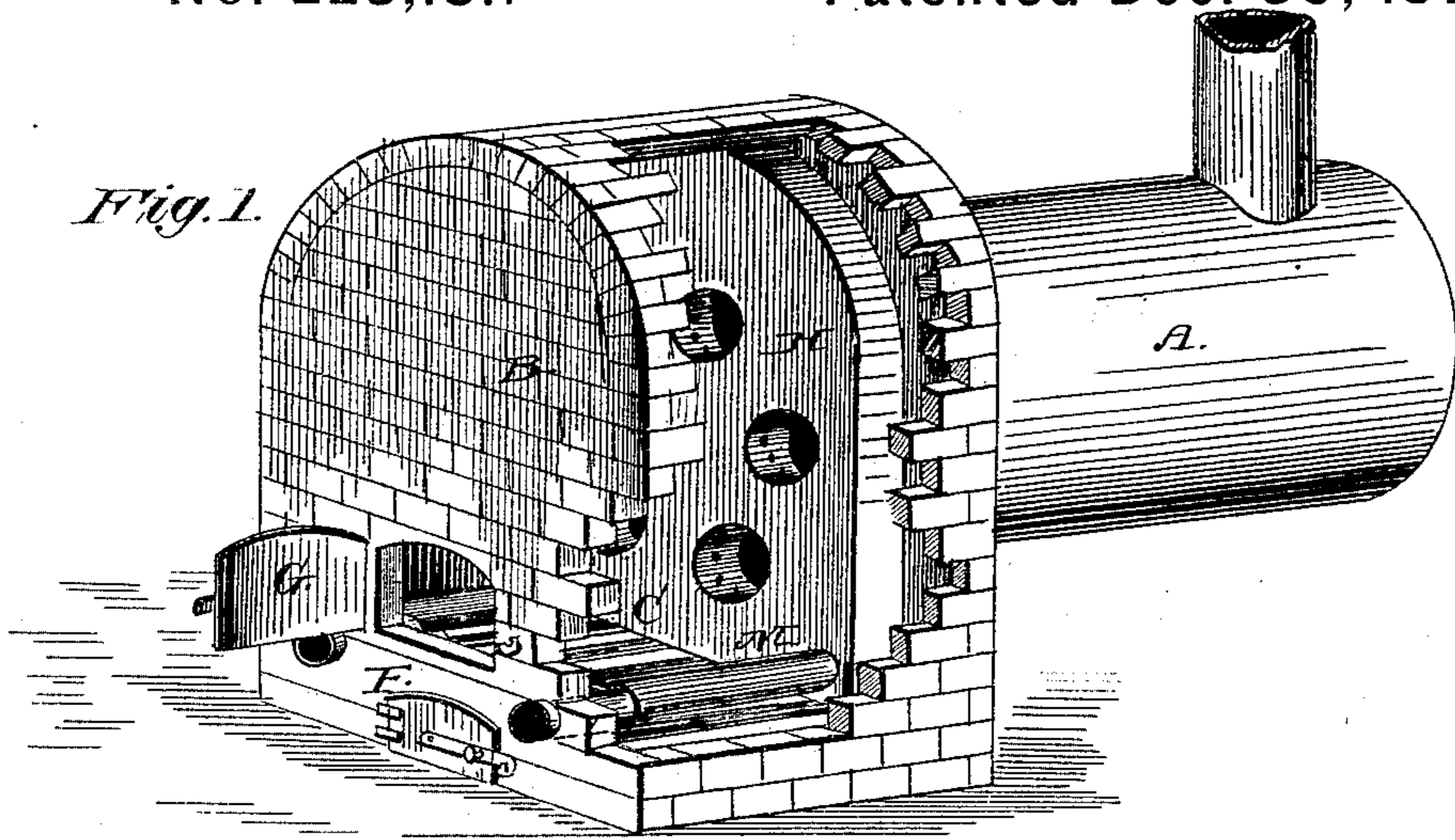


W. D. SMITH.
Furnace.

No. 223,181.

Patented Dec. 30, 1879.



Witnesses:
Ed. G. Dietrich

J. R. Littell,

Inventor:

Walton D. Smith,

by *Chas. Brown & Co.*

attys.

UNITED STATES PATENT OFFICE.

WALTON D. SMITH, OF PROPHETSTOWN, ILLINOIS, ASSIGNOR OF ONE-HALF
OF HIS RIGHT TO D. K. SMITH, OF SAME PLACE.

IMPROVEMENT IN FURNACES.

Specification forming part of Letters Patent No. **223,181**, dated December 30, 1879; application filed
October 27, 1879.

To all whom it may concern:

Be it known that I, WALTON D. SMITH, of Prophetstown, in the county of Whiteside and State of Illinois, have invented certain new and useful Improvements in Furnaces; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

Figure 1 is a perspective view of a boiler and furnace to which my invention has been applied, parts having been broken away for the purpose of better showing the construction. Fig. 2 is a vertical cross-section. Fig. 3 is a longitudinal sectional view; and Fig. 4 is a vertical section, illustrating the application of my invention to an ordinary heating-stove.

Corresponding parts in the several figures are denoted by like letters of reference.

This invention relates to smoke-consuming furnaces; and it consists in the construction and arrangement of parts which will be hereinafter more fully described, and particularly pointed out in the claim.

In the drawings hereto annexed, A represents an ordinary steam-boiler, and B the furnace, in which latter C represents the fire-chamber, D the ash-pit, E the grate-bars, F the door of the ash-pit, and G the furnace-door.

H is what I term the "hot-air chamber." This consists of two heads or plates, I I, connected by short tubes J J, and a rim or casing, K, after the manner of an ordinary flue-boiler; and it will be observed that when, as illustrated in Figs. 1, 2, and 3 of the drawings, the invention is applied to a flue-boiler furnace, the tubes J J should be made to register with the flues in the boiler.

The chamber is placed in the furnace, upon the grate-bars of the latter, a short distance in front of the boiler, and the head-plate of the chamber facing the boiler is provided with a number of small openings or perforations, L, surrounding the tubes J; or the perforations L may be omitted and the tubes J

perforated instead; or perforations may be made in both the head-plate and the tubes, as circumstances may require.

M M are pipes or tubes extending from the chamber H through the fire-box and out through the front of the latter, where they are open for the admission of air.

In operation the air, in its passage through the tubes M, becomes heated in the furnace. It therefore ascends in the hot-air chamber H, to the lower side of which the tubes are connected, and passes out through the perforations L. The products of combustion in the meantime pass through the tubes J, and are mingled with the fresh-heated oxygen, by which combustion is again induced, which causes the gases and smoke to be totally consumed in their passage through the boiler-flues.

The hot-air chamber H may be applied to an ordinary heating-stove, as shown in Fig. 4 of the drawings, by reference to which it will be seen that it forms a diaphragm placed in the smoke-drum just above the fire-pot.

The operation is essentially as above described.

My improved hot-air chamber or smoke-consumer may be made in two or more sections, so as to facilitate its application to stoves and furnaces already in use, and a fan or blower may be used to force the air through it without changing the nature of my invention.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

The combination, in a boiler-furnace, of a tubular boiler, A, with a hot-air chamber, H, arranged in front of said boiler, and having perforated tubes or flues registering with the boiler-flues, and pipes M, passing through the furnace above the grate, and supplying air from the exterior, as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in presence of two witnesses.

WALTON DUANE SMITH.

Witnesses:

D. K. SMITH,
S. A. KLEESPIE.