

(No Model.)

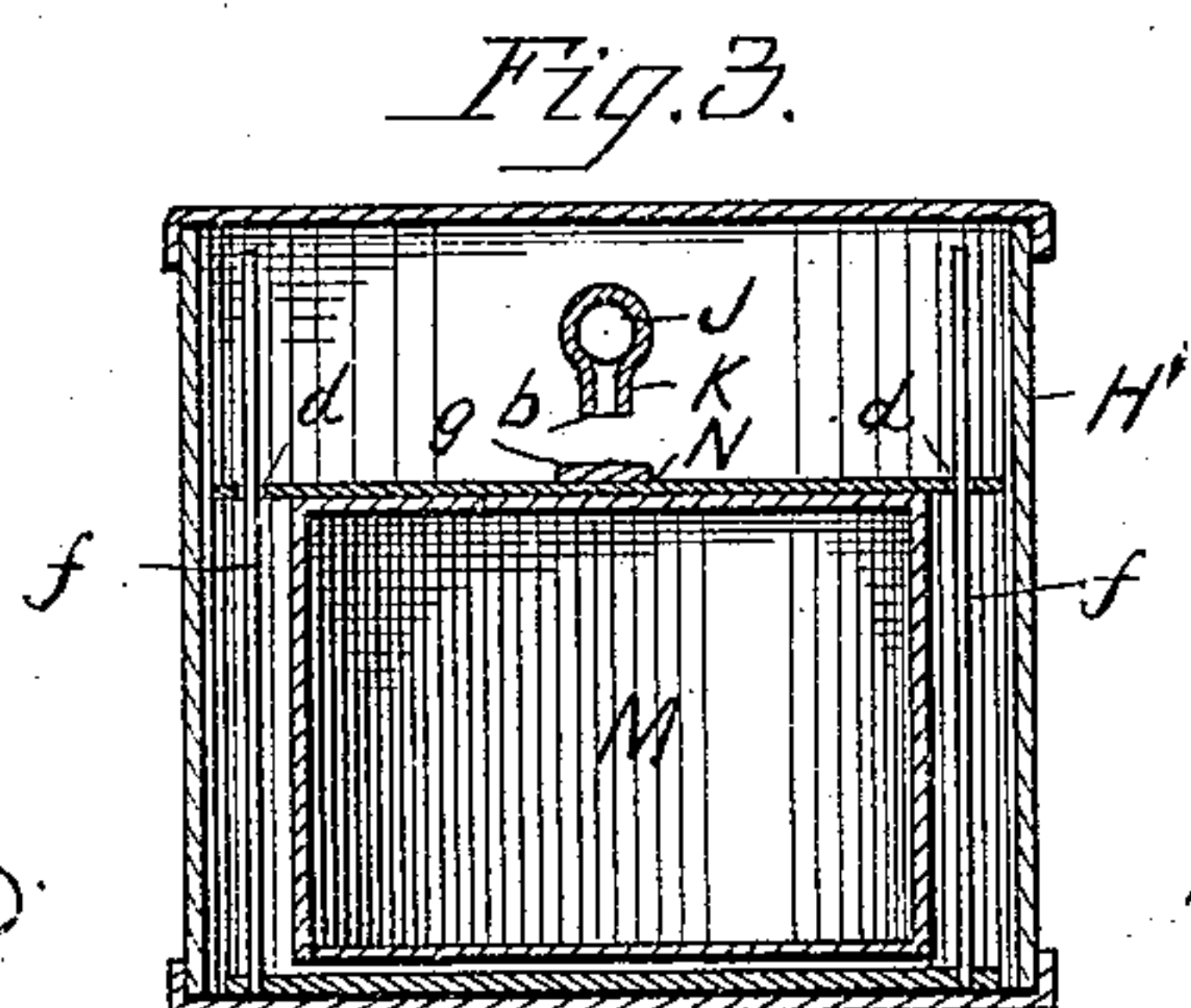
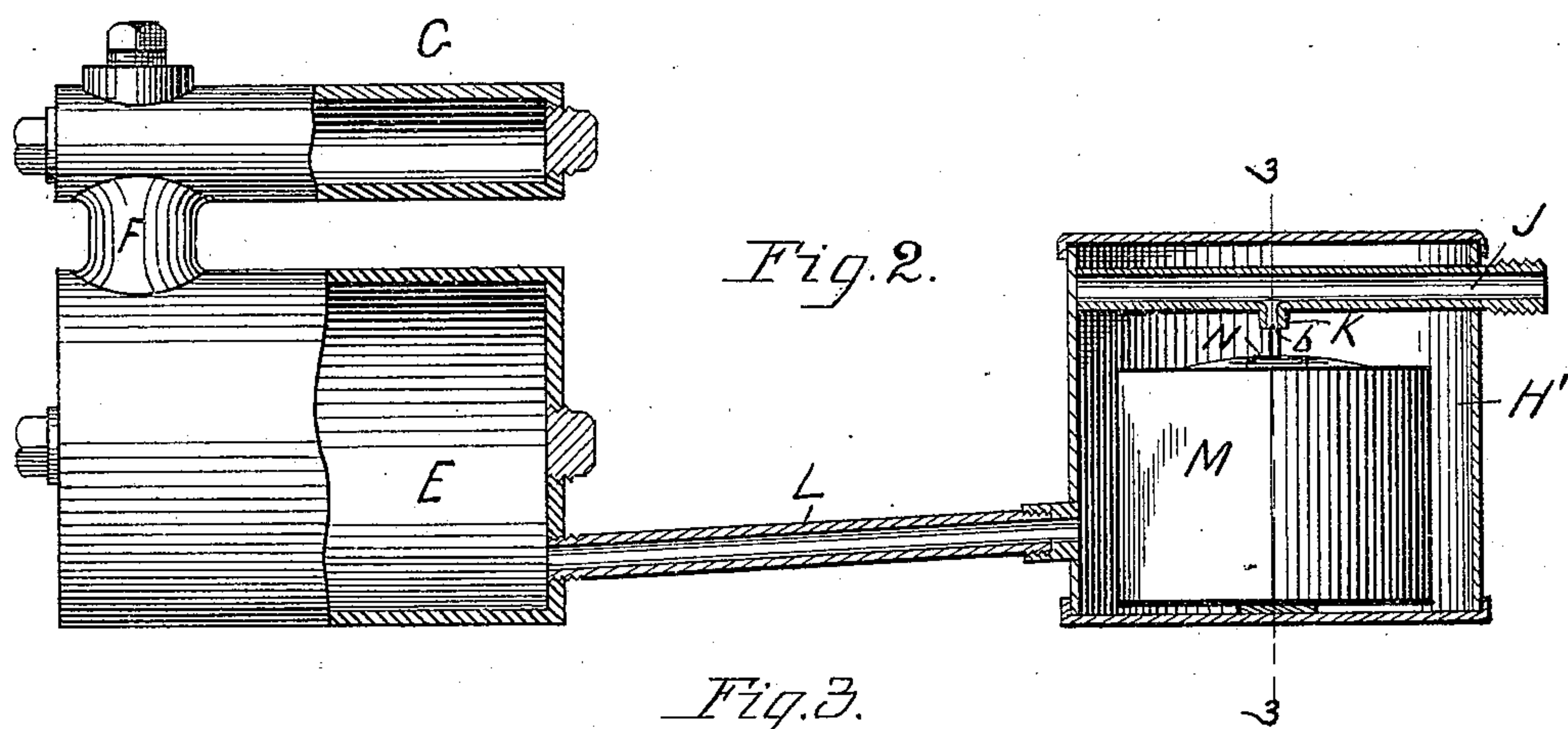
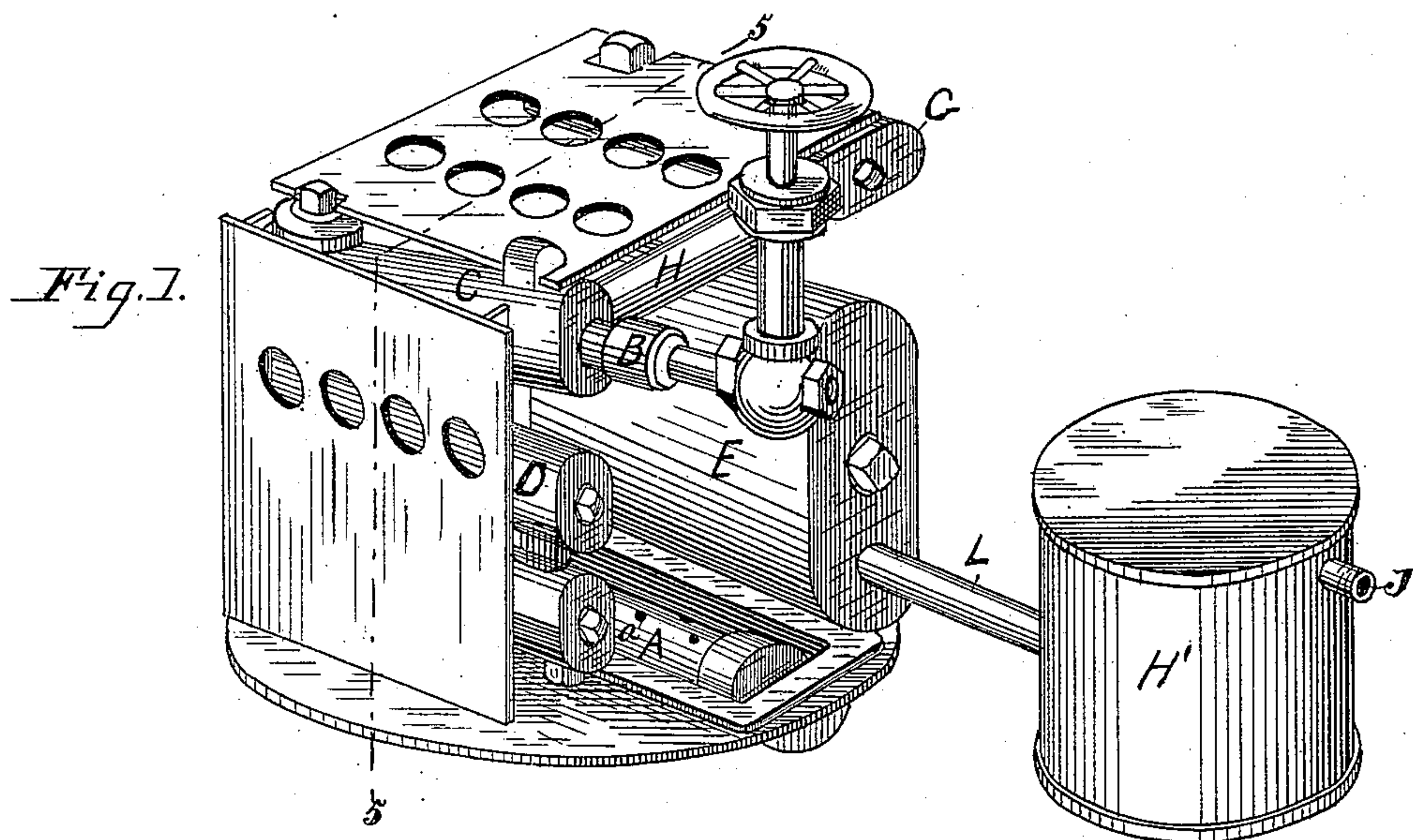
2 Sheets—Sheet 1.

D. E. BANGS.

VALVE FOR VAPOR BURNERS.

No. 312,067.

Patented Feb. 10, 1885.



Witnesses

Wm. S. Bellows

Geo. W. M. Given.

David E. Bangs,
Inventor,

per Brown Bros.

Attorneys

(No Model.)

2 Sheets—Sheet 2.

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Fig. 4.

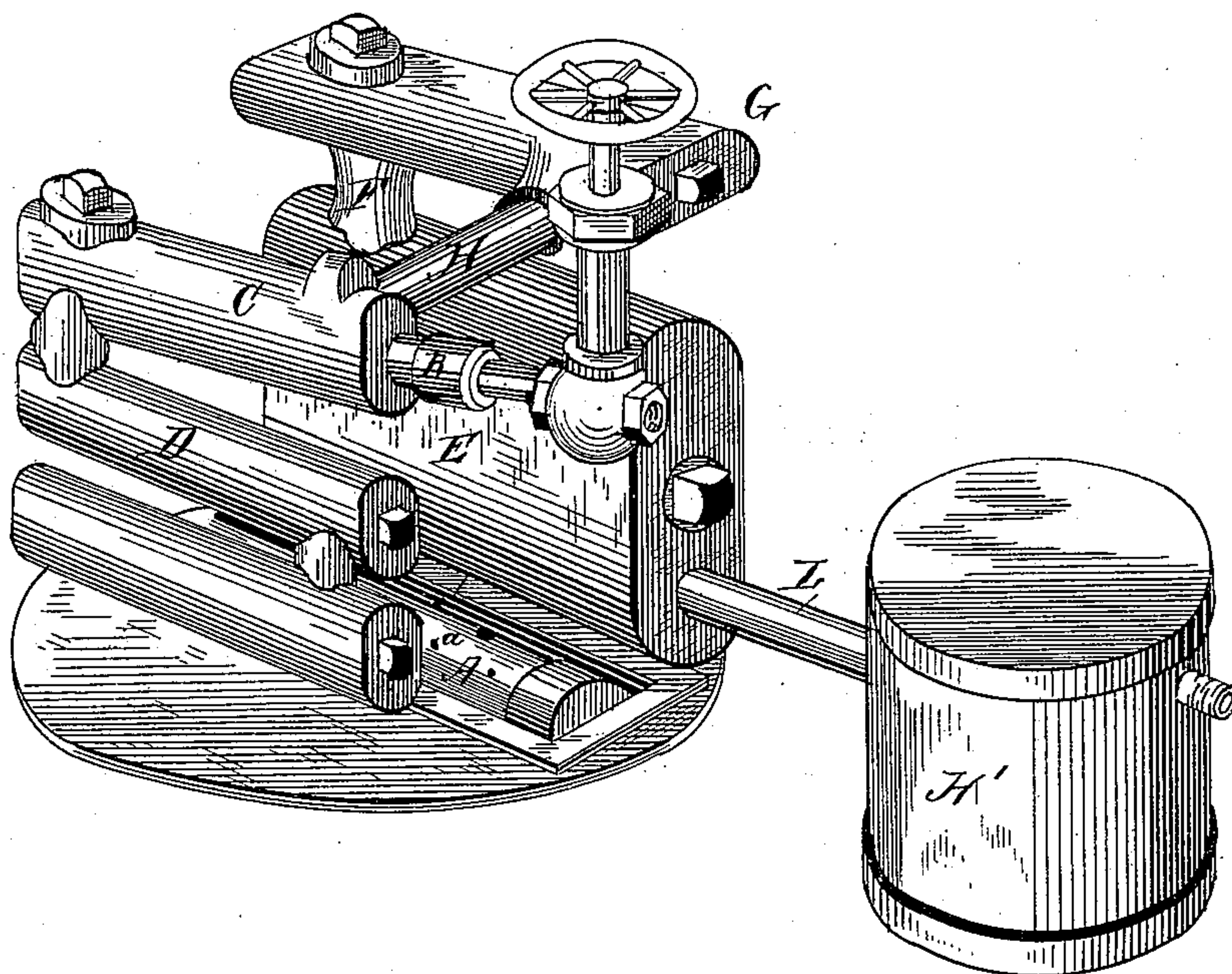
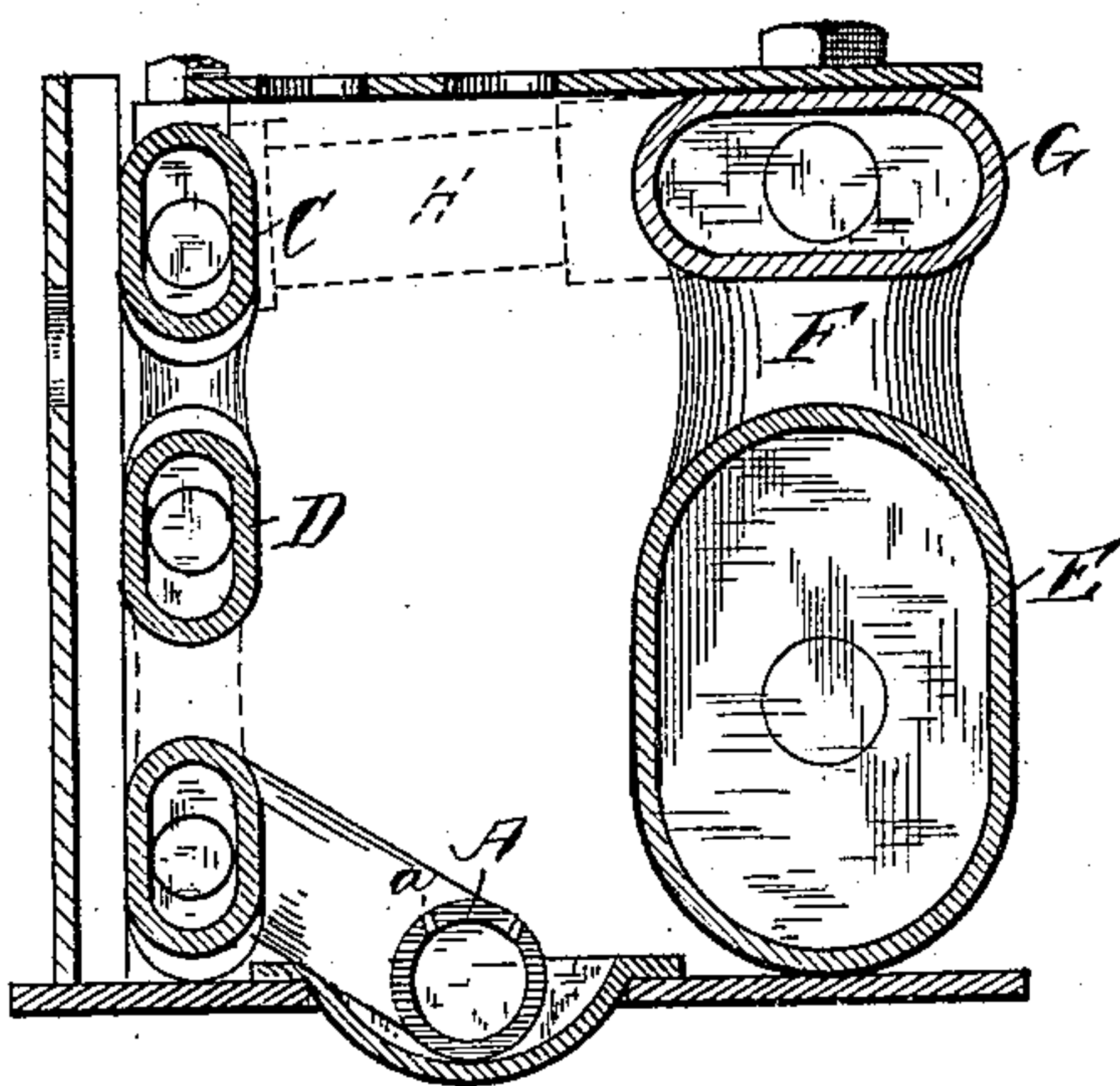


Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

DAVID E. BANGS, OF MEDFORD, MASSACHUSETTS.

VALVE FOR VAPOR-BURNERS.

SPECIFICATION forming part of Letters Patent No. 312,067, dated February 10, 1885.

Application filed December 18, 1883. (No model.)

To all whom it may concern:

Be it known that I, DAVID E. BANGS, of Medford, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Valves for Vapor-Burners, of which the following is a full, clear, and exact description.

This invention relates to improvements in that class of vapor-burners wherein steam is combined with the gas and in such condition consumed at the burner.

The object of the invention is to provide novel means for delivering combined steam and gas to the burner, and automatically controlling the quantity of water delivered to the chamber wherein the steam is generated by the heat of the flame from the burner. This I accomplish in the manner and by the means hereinafter described and claimed, reference being had to the accompanying drawings, illustrating my invention, in which—

In Sheet 1, Figure 1 is a view in perspective of a vapor-burner for the burning of the vapor of hydrocarbon oil and steam, having the present invention combined therewith. Fig. 2 is a vertical longitudinal section of the present invention, with a detail side and detail sectional view of the vapor-burner; Fig. 3, a vertical cross-section on line 3 3, Fig. 2. In Sheet 2, Fig. 4 is a view in perspective similar to Fig. 1, but with some of the parts removed. Fig. 5 is a vertical cross-section on line 5 5, Fig. 1.

In the drawings, A represents the burner-tube of a vapor burner, having jet-holes *a*, at which the vapors of the hydrocarbon oil and steam are burned, the oil being supplied from a pipe, B, connected to and leading from a tank or reservoir holding the oil, through pipes C and D to the burner.

E is the chamber or boiler for the water, and in which the steam is generated, the steam passing through a pipe, F, into a pipe or chamber, G, where it becomes superheated, and then passes through a pipe, H, into the pipe B, to there combine with the oil as it enters therein, and with it pass to the burner-tube A to be burned, all substantially as described and shown in a patent granted to me on the 29th day of January, 1884, No. 292,616, and needing no particular description herein.

H' is a tank or reservoir, into which water

enters through a pipe, J, and its downwardly-projecting nozzle K, from any suitable and constant supply. The nozzle or inlet K is preferably of small diameter, for the water to pass through it into the tank slowly and in a small quantity at a time. A pipe, L, connects the tank H' at or near its bottom with the boiler-chamber E, at or near its bottom, running in an inclined direction, as shown, to insure a free flow of the water by its gravity.

M is an air-tight cylinder or float, located in the tank H', so that as the water flows through the nozzle K into and fills the tank H' and the water-chamber E the float M, from its buoyancy, will rise in the tank accordingly, and when the water is at the desired height in the boiler for the generation of the required amount of steam the float M will then abut by its upper surface, N, against the open end *b* of the nozzle K, and, acting as a valve, will close said opening and stop the water from entering the tank so long as the water is at such height; but as the water in the boiler-chamber becomes vaporized, and consequently diminishes in quantity, the quantity in the tank will correspondingly diminish, and the float will then fall from its seat on the end *b* of the nozzle K, allowing water to again enter the tank until the water in the boiler is again at the right height, when the float will again close the inlet *b* and stop the flow of the water, and so on during the operation of the burner. The float M in its upward and downward movement in the tank is guided by eyes *d*, secured on opposite sides of the tank, arranged to slide over vertical guide-rods *f*, attached to the bottom of the tank. An elastic washer, *g*—such as india-rubber or other suitable elastic material—is secured to the float M, where it abuts against the inlet-pipe, to secure a close fit at such point and insure the closing of the inlet to the entrance of water into the tank. The movements of the float when the burner is in operation are very slight, as a slight variation of the amount of the water in the steam-generating chamber instantly causes the float to rise or fall accordingly, and thus close or open the water-supply pipe to the tank.

In the operation of vapor-burners in which steam is combined and burned with oil-vapors, it is very important that there should be a constant, uniform, and the right amount of steam

for the proper combination with the oil and the best practical results in the operation of the burner, for if less steam is generated, more or less smoke and carbon are produced, lessening the amount of heat and the efficiency of the burner; and if too much steam is generated the flame will be diminished and probably go out, and it is also important that such should be accomplished automatically, and not left for the care and attention of the attendant. In the present invention the amount of steam necessary for the best practical results in burning a vapor-burner is secured, as the float or valve M automatically regulates and controls the amount of water entering the boiler-chamber for the generation of the requisite amount of steam.

In lieu of an air-chamber for the float, a piece of cork or any material that is of less specific gravity than the water can be used, and in lieu of having the float abut against the nozzle itself it can operate through a system of levers, and in such case the water could enter at the bottom of the tank, but as described and shown is simple, efficient, and practical. The boiler-chamber for the best practical results and to allow sufficient space for the generation of steam should be kept about one-half full. The float can be guided in its movements in other ways than as shown.

Having thus described my invention, what I claim is—

1. The combination, in a vapor-burner, of a burner, an oil-pipe, and a steam-chamber delivering combined steam and gas to the burner, said steam-chamber being adjacent to and heated by the flame from the burner, and provided with a water-supply and an automatically-operated float or valve controlling the supply of water to the steam-chamber, for the generation of the proper quantity of steam to be combined with the vaporized gas, substantially as described.

2. The combination, in a vapor-burner, of a burner, A, an oil-pipe connecting therewith, a water-chamber adjacent to and heated by the flame from the burner to generate steam, and connected with the oil-pipe to deliver steam thereto, a water-supply delivering water to the said chamber, and a float or valve

operated by the supply-water to control the supply of water and the generation of the proper quantity of steam delivered to the oil-pipe, substantially as described.

3. The combination, in a vapor-burner, of a burner, A, an oil-supply pipe, H, connecting therewith, a water-chamber adjacent to and heated by the flame from the burner and connecting with the oil-pipe to deliver steam thereto, a water tank or reservoir connected with the said chamber, a water-pipe for delivering water to the tank or reservoir, and a float or valve operated by the water delivered to the tank or reservoir to control the inlet of water through the water-pipe, substantially as described.

4. The combination of a burner, A, an oil-supply pipe, H, connecting therewith, a steam-superheater connected with the supply-pipe, a water-chamber communicating with the superheater, and arranged adjacent to and heated by the flame from the burner to generate steam, a water-supply connected with the water-chamber, and an automatically-operated float or valve controlling the delivery of water to said water-chamber for the generation of the proper quantity of steam to be delivered to the oil-pipe, substantially as described.

5. The combination of a burner, A, an oil-supply pipe, H, connecting therewith, a steam-superheating chamber, G, connected with the oil-supply pipe, a water-chamber, E, communicating with the superheating-chamber and arranged adjacent to and heated by the flame from the burner for the generation of steam, a water tank or reservoir connected with the water-chamber, a water-supply pipe having an orifice for delivering the water-supply to the tank or reservoir, and a float or valve operated by the water in the tank or reservoir to control the delivery of the supply of water thereto, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

DAVID E. BANGS.

Witnesses:

EDWIN W. BROWN,
WM. S. BELLOWS.