(No Model.) 4 Sheets—Sheet 1.

J. E. BOTT.

GAS GENERATOR FOR FURNACES.

No. 285,561. Patented Sept. 25, 1883.

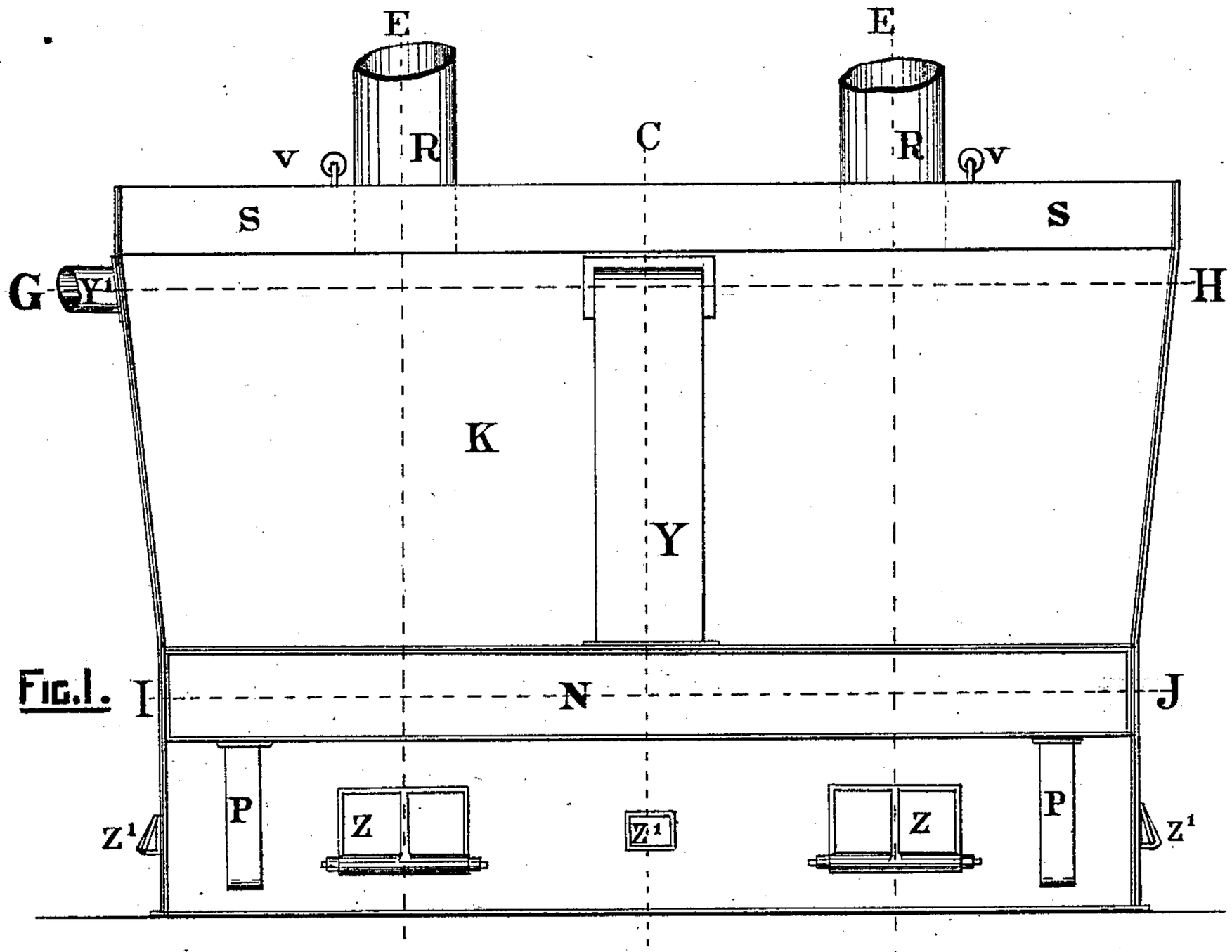

FIG. 1.

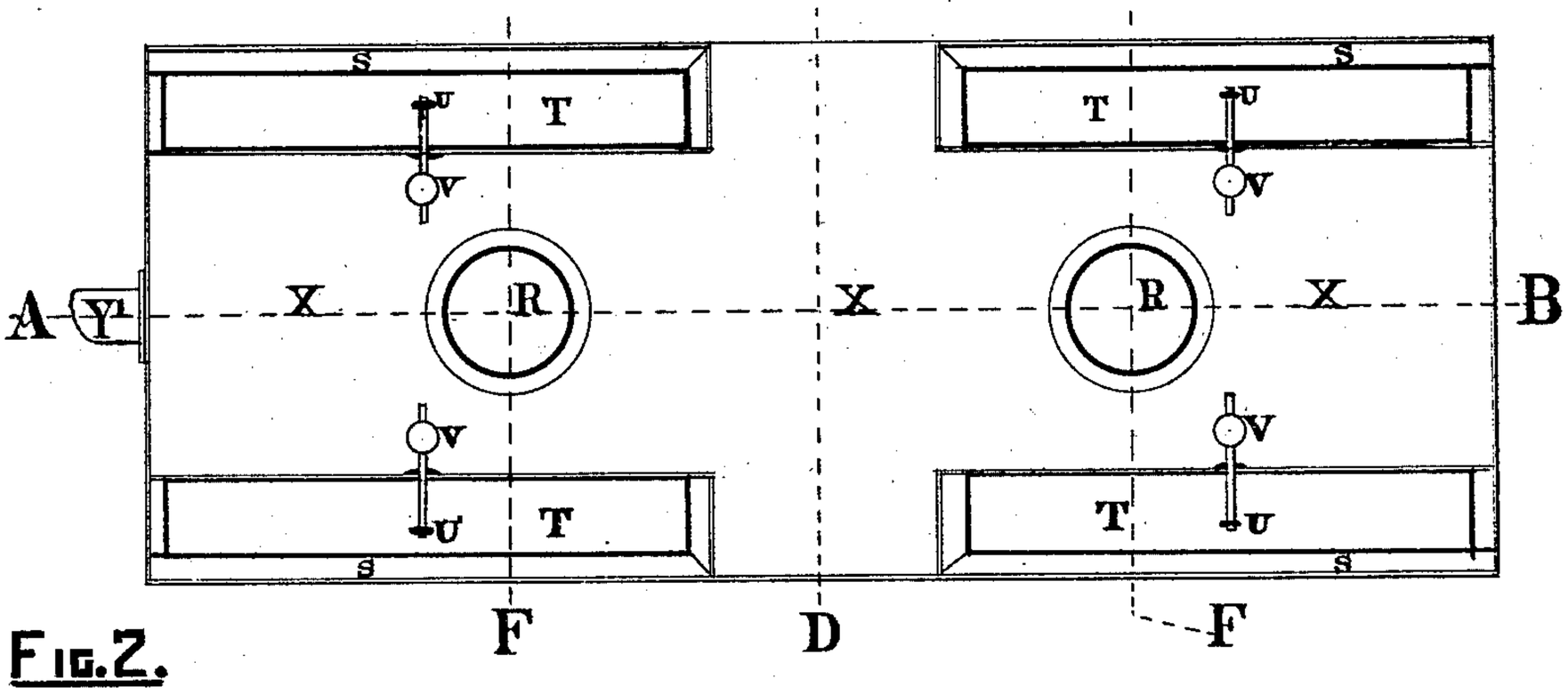

FIG. 2.

WITNESSES:

James L. Jobin

Harry L. Askenfelter

INVENTOR

Joseph Elton Bott

by his Attorneys

Howson and Sons

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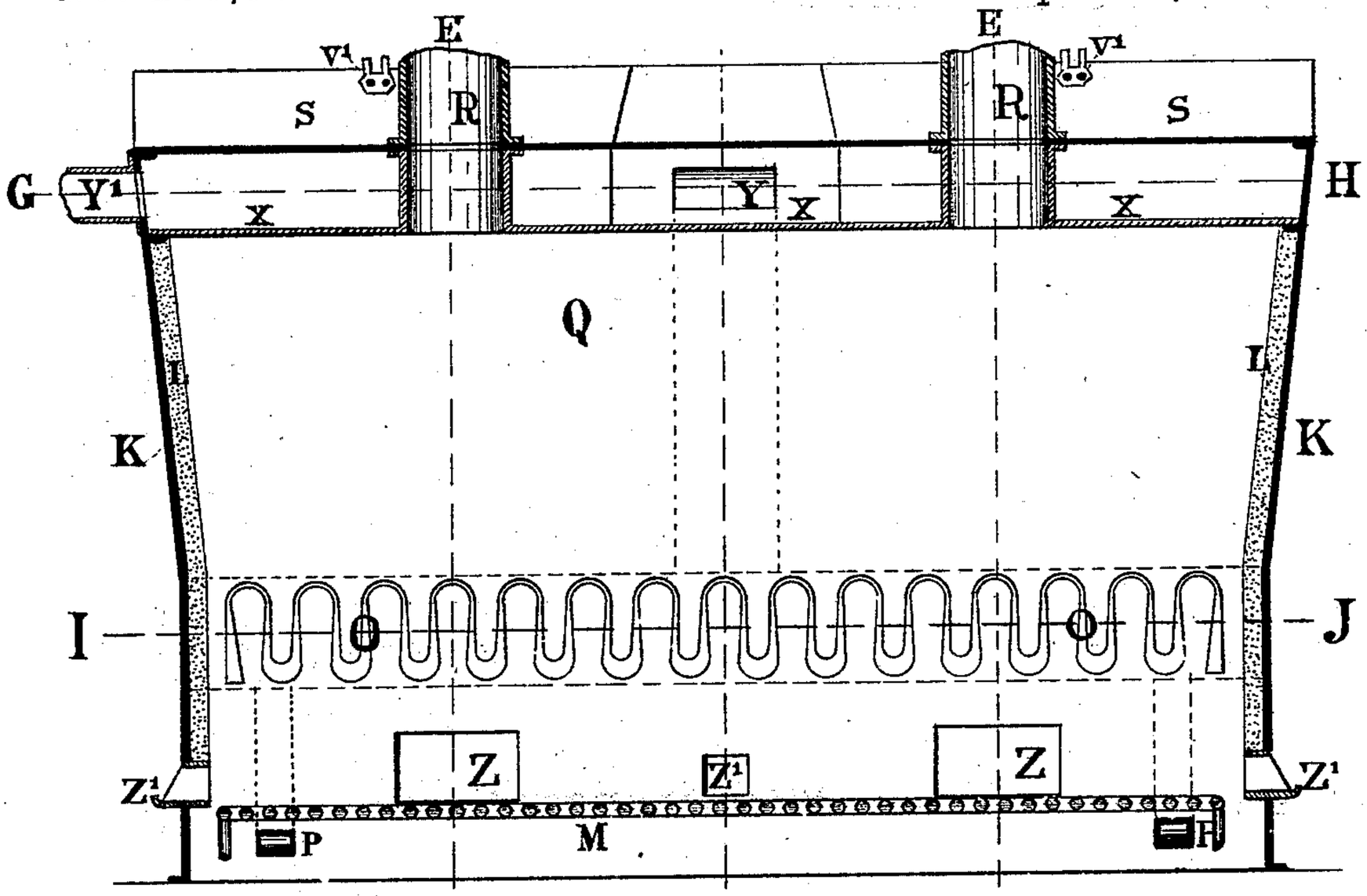

FIG. 3.

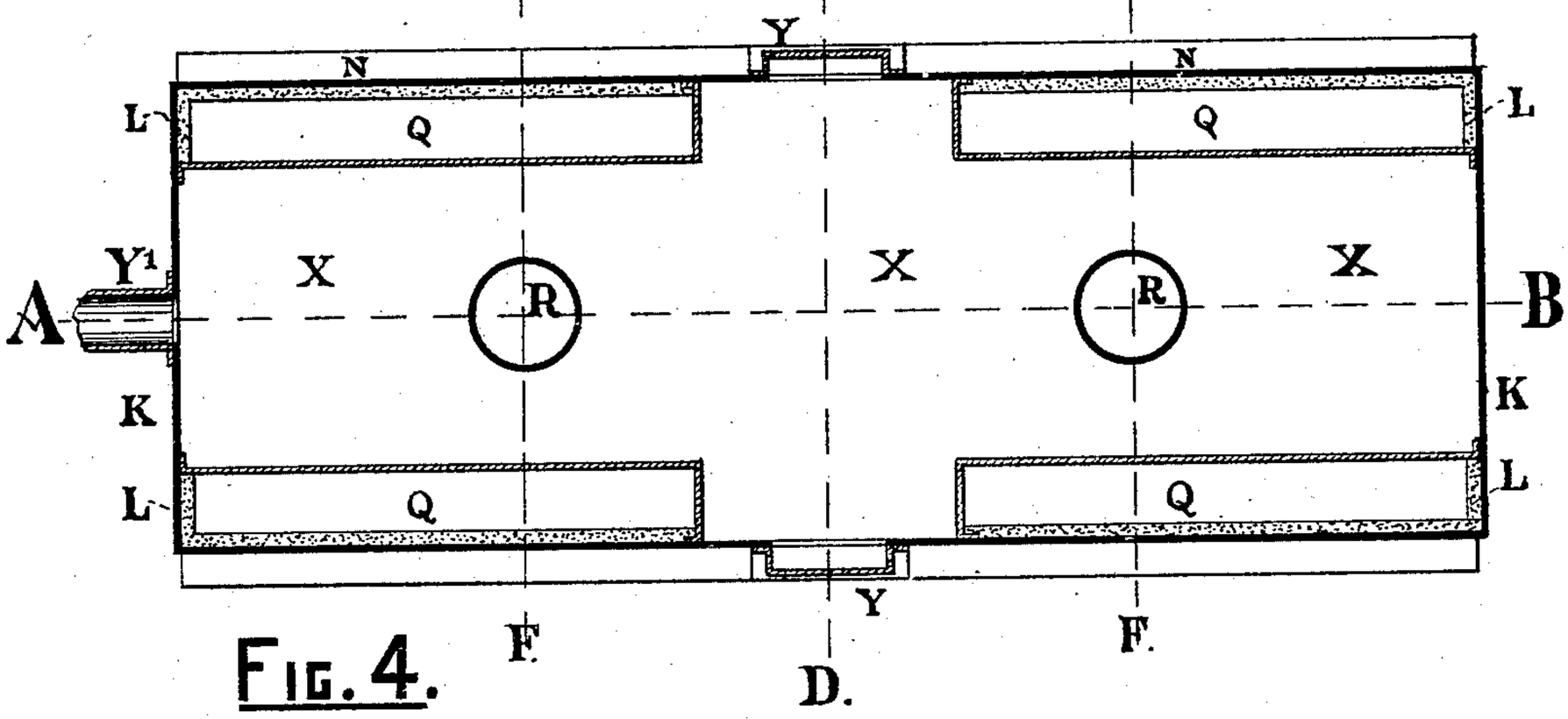

FIG. 4.

WITNESSES:

James F. Fobin

Harry L. Achenfelter

INVENTOR

Joseph Elton Bott

by his Attorneys

Howson and Sons

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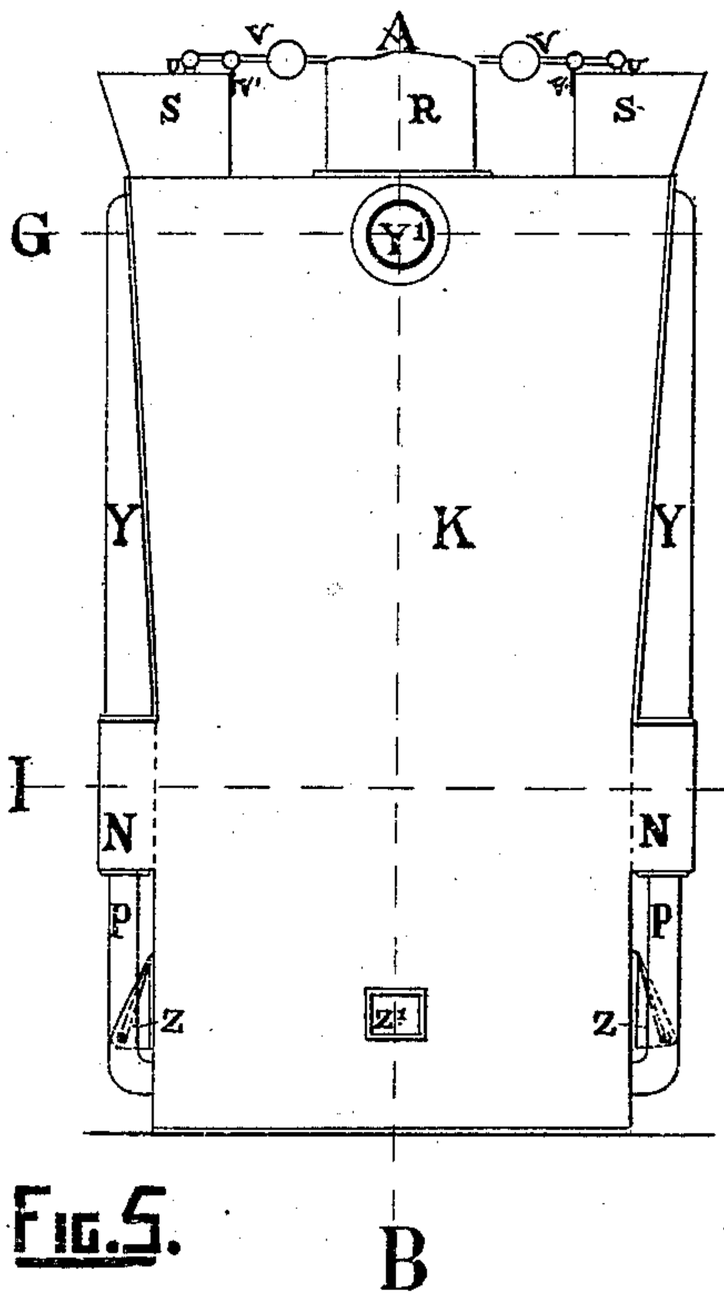

FIG. 5.

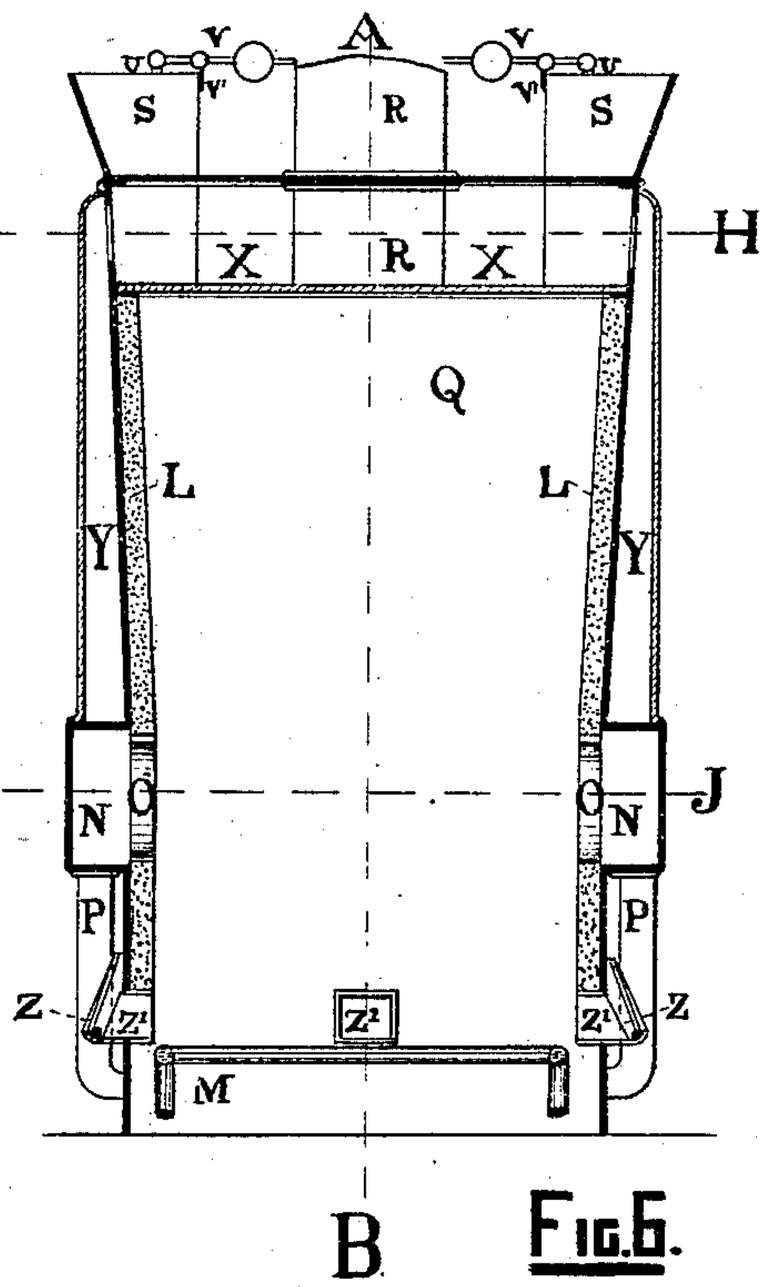

FIG. 6.

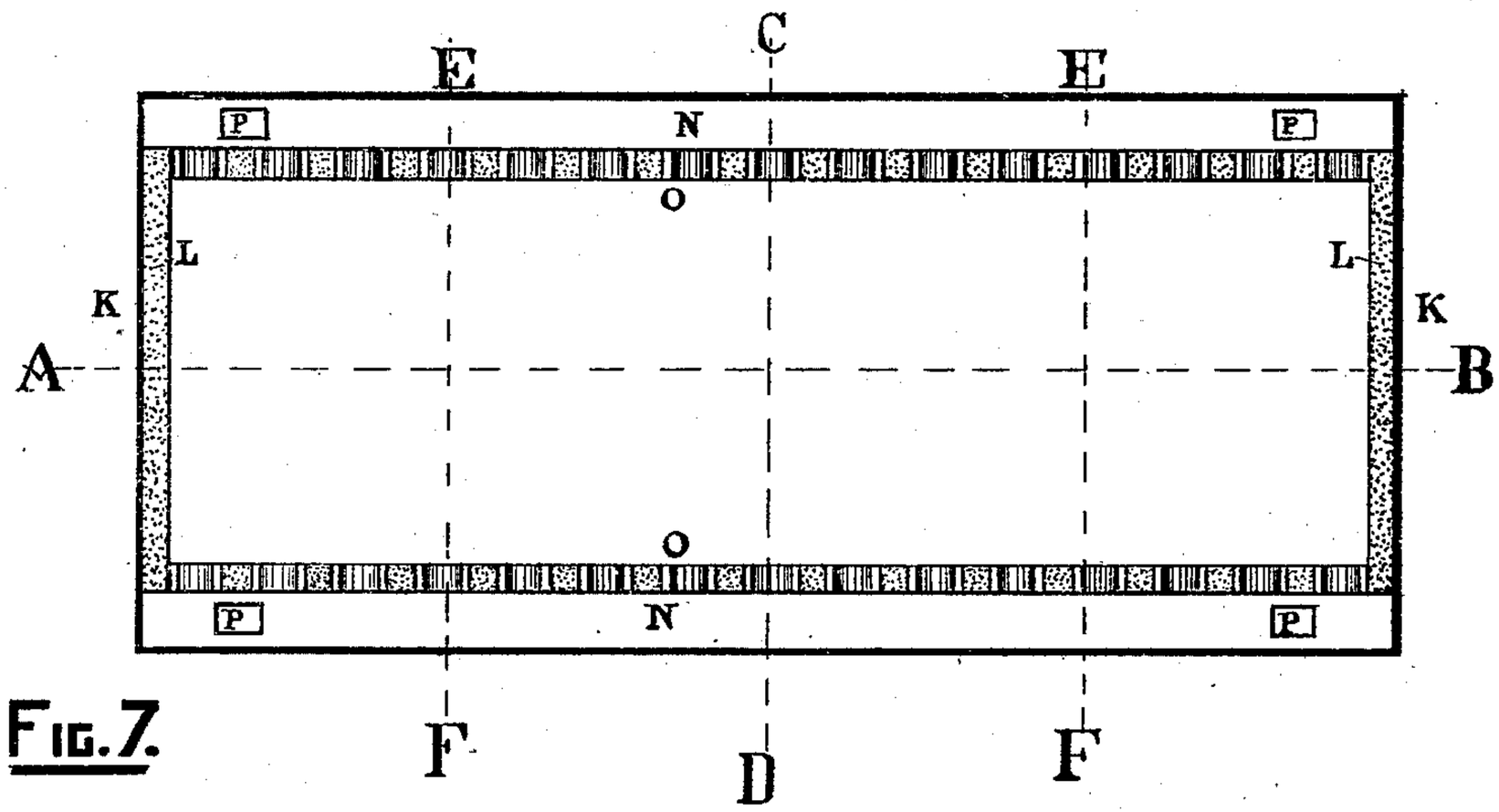

FIG. 7.

WITNESSES:

James F. Jobins

Harry L. Askenfelter

INVENTOR

Joseph Elton Bott.

by his Attorneys

Howson and Sons

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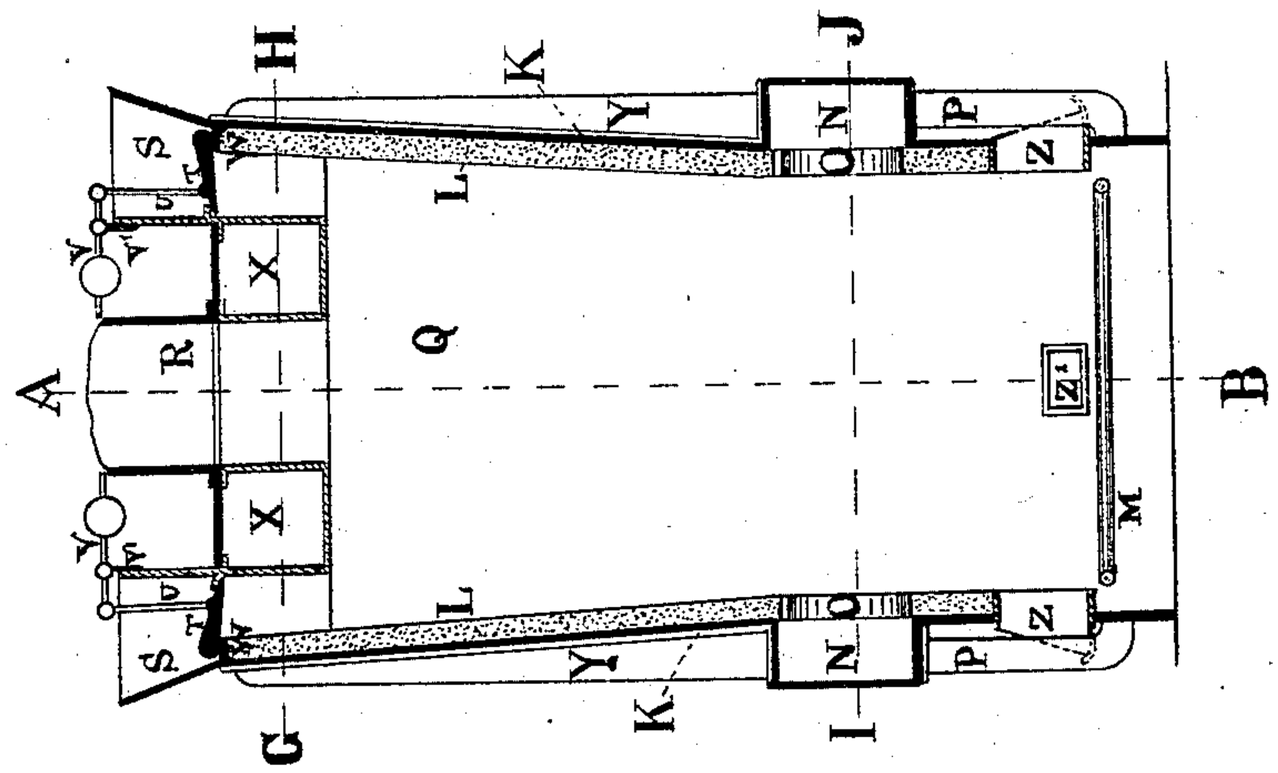

FIG. 8.

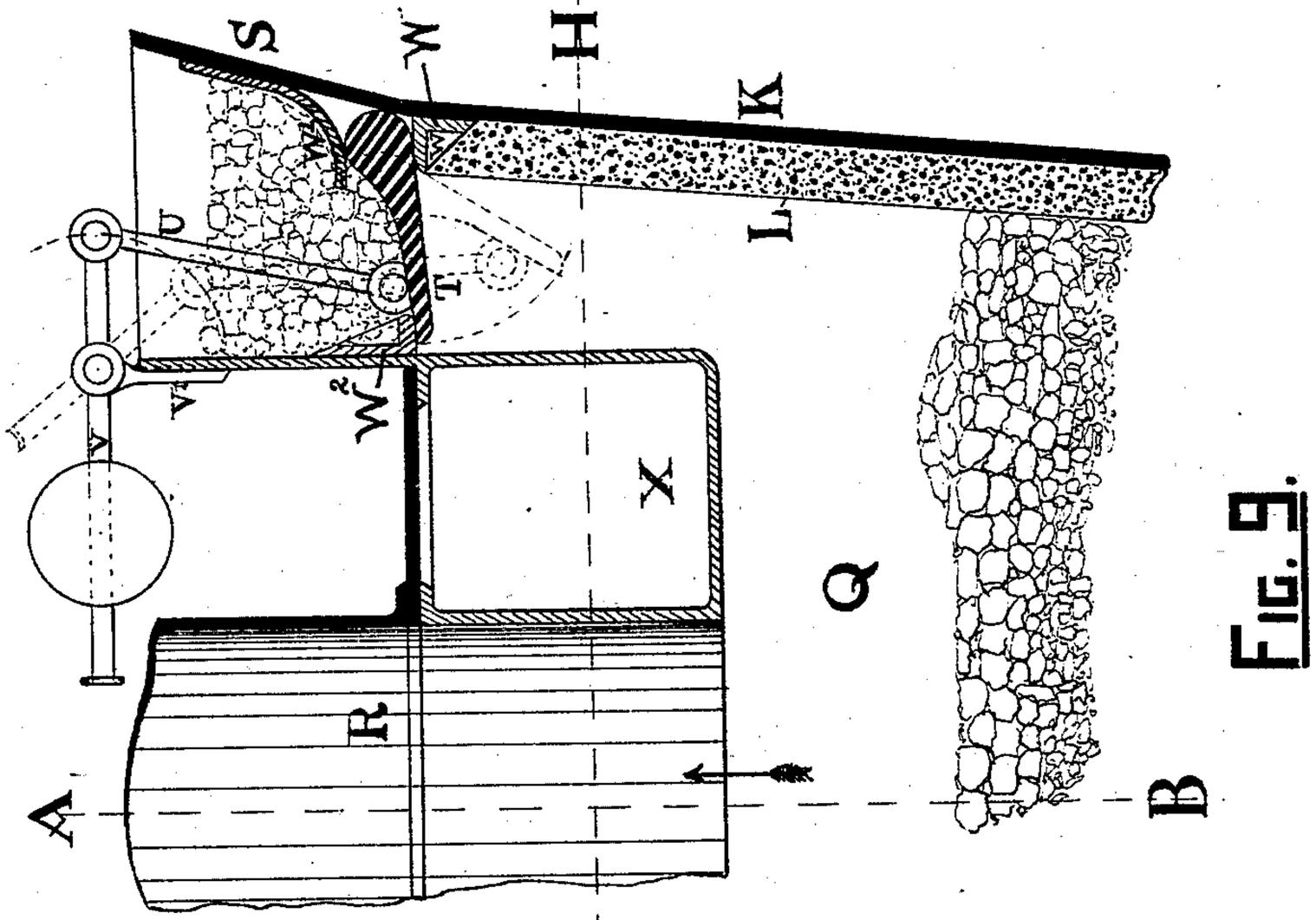

FIG. 9.

WITNESSES:

James F. Jobin

Harry L. Achenfelter.

INVENTOR

Joseph Elton Bott

by his Attorneys

Howson & Howson

UNITED STATES PATENT OFFICE.

JOSEPH E. BOTT, OF MARCUS HOOK, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO JOHN M. BROOMALL, JR., OF MEDIA, AND EDDY L. CLARK AND EDWARD H. BURR, OF PHILADELPHIA, PENNSYLVANIA.

GAS-GENERATOR FOR FURNACES.

SPECIFICATION forming part of Letters Patent No. 285,561, dated September 25, 1883.

Application filed March 19, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH ELTON BOTT, a subject of the Queen of Great Britain and Ireland, and a resident of Marcus Hook, Delaware county, Pennsylvania, United States of America, have invented certain Improvements in Gas-Generators for Furnaces, of which the following is a specification.

My invention relates to certain improvements in apparatus for generating gases for use in heating, puddling, smelting, and other furnaces, my improvements being mainly in connection with the tuyeres and the fuel-supplying devices, all as hereinafter fully set forth.

In the accompanying drawings, Figure 1, Sheet 1, is a side view of my improved gas-generator; Fig. 2, a plan view of the same; Fig. 3, Sheet 2, a longitudinal section on the line A B; Fig. 4, a sectional plan on the line G H; Fig. 5, Sheet 3, an end view of the generator; Fig. 6, a transverse section on the line C D; Fig. 7, a sectional plan on the line I J; Fig. 8, Sheet 4, a transverse section on the line E F; and Fig. 9, an enlarged view of part of Fig. 8.

The casing K of the generator is preferably composed of cast or wrought iron plates suitably fastened together, and having a lining, L, of fire-brick or other refractory material. The casing incloses the gas-generating chamber Q, at the bottom of which is a water-tube grate, M, on which the coal or other fuel is deposited, access to the lower portion of the mass of fuel being had through doors Z in the sides of the casing, and openings Z′ being formed in the sides and ends of said casing for the insertion of implements wherewith the fuel on the grate may be stirred or agitated. (See Figs. 1, 3, 6, and 8.)

In each side wall of the generator is formed a continuous corrugated tuyere, O, which extends from end to end of the generator, as shown in Figs. 3 and 7; or, if the latter is made of circular instead of quadrangular form, the tuyere would by preference extend completely around it.

Extending along each side of the casing, and communicating with the chamber Q through the tuyere, is a tuyere-box, N, which receives a supply of heated air through a pipe or duct, Y, from an air-heating box, X, in the top of the chamber Q, this box receiving its supply of air through a pipe, Y′, at one end. (See Figs. 1, 4, 6, 7, and 8.) Branch pipes P afford communications between the boxes N and the ash-pit, so as to provide a supply of heated air beneath the grate, Figs. 1, 3, 5, and 6. The flow of air through the tuyeres O into the mass of fuel in the chamber Q may be as gentle or as forcible as desired, this being governed by regulating the pressure of the blast of air entering the box X through the pipe Y′. Whatever may be the force of the blast, however, it is uniform from end to end of the generator, owing to the continuous tuyere; and I am thus enabled to produce large volumes of gas, even when inferior fuel is employed, for the heated air is diffused in a thin stratum throughout a large mass of incandescent fuel, thorough distribution of the air being insured and uniform combustion taking place, so that the distillation of the fuel proceeds regularly, and the ash or residue is left in a more friable form than when the blast is admitted in forcible and concentrated jets through isolated tuyeres, for in the latter case combustion throughout the mass is more or less irregular, and there is a tendency to fuse the ash and form clinkers in the vicinity of the tuyeres. Moreover, in my improved generator the diffused blast through the continuous tuyere can be safely reduced, when it is desired to curtail the production of gas, without causing the zone of active combustion to become uneven, as is the case when the blast is admitted through isolated tuyeres.

It will be observed that the corrugated tuyere diminishes in area at and near the top, this being the preferable form of the tuyere, as the fuel at the top of the tuyere is not in such an active state of combustion as that at the base of the tuyere. The gases evolved from the fuel are mixed in the upper portion of the

chamber Q and pass off through the pipes R to the regenerator or other point at which they are to be used.

Above the casing of the generator, and at each side of the same, are the fuel-hoppers S, which are narrow quadrangular boxes, the continuity of which is interrupted at the air-duct Y, Figs. 2 and 4. Each of these hoppers is closed by a valve, T, the thickened butt-end of which rests upon a rib, W, on the inside of the casing L, the thin front edge of the valve closing against a rib, W^2, in the hopper, so as to form a gas-tight joint. Each valve is connected by a rod, U, to a weighted lever, V, hung to a bracket, V′, on the hopper, and tending to keep the valve closed. (See Fig. 9.) Fuel is deposited in the hoppers, and when it becomes necessary to replenish the chamber Q the valves are depressed, so as to permit the descent of the fuel into said chamber. The supplies of fuel are deposited at and near the sides of the chamber, where the action of the air-blast is most effective; hence I consider this method of feeding more advantageous than a central feed, such as is usually employed. The valves T simply rest on the ribs W, no hinges or pivots being used in connection with said valves, so that when a valve becomes burned out or otherwise injured it can be readily removed and a new one inserted. To prevent the access of fuel to the space behind the valve, or between the valve and the rib W, I use a flexible strip, W′, preferably of thin sheet metal, the upper end of which is secured to the inside of the hopper-casing, the lower free end bearing on the valve at and near the butt of the same. (See Fig. 9.)

I claim as my invention—

1. The combination of the fuel-chamber of a gas-generating furnace with a tuyere having a waved or corrugated outline, as set forth.

2. The combination of the fuel-chamber with a waved or corrugated tuyere contracted in area at and near the top, as set forth.

3. The combination of the fuel-hoppers, the ribs W, and seats W^2 with the valves T, resting on the ribs W and closing against the seats W^2, as set forth.

4. The combination of the fuel-hopper, rib W, and valve T with the projecting strip W′, as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOSEPH ELTON BOTT.

Witnesses:
HARRY L. ASHENFELTER,
HARRY SMITH.