

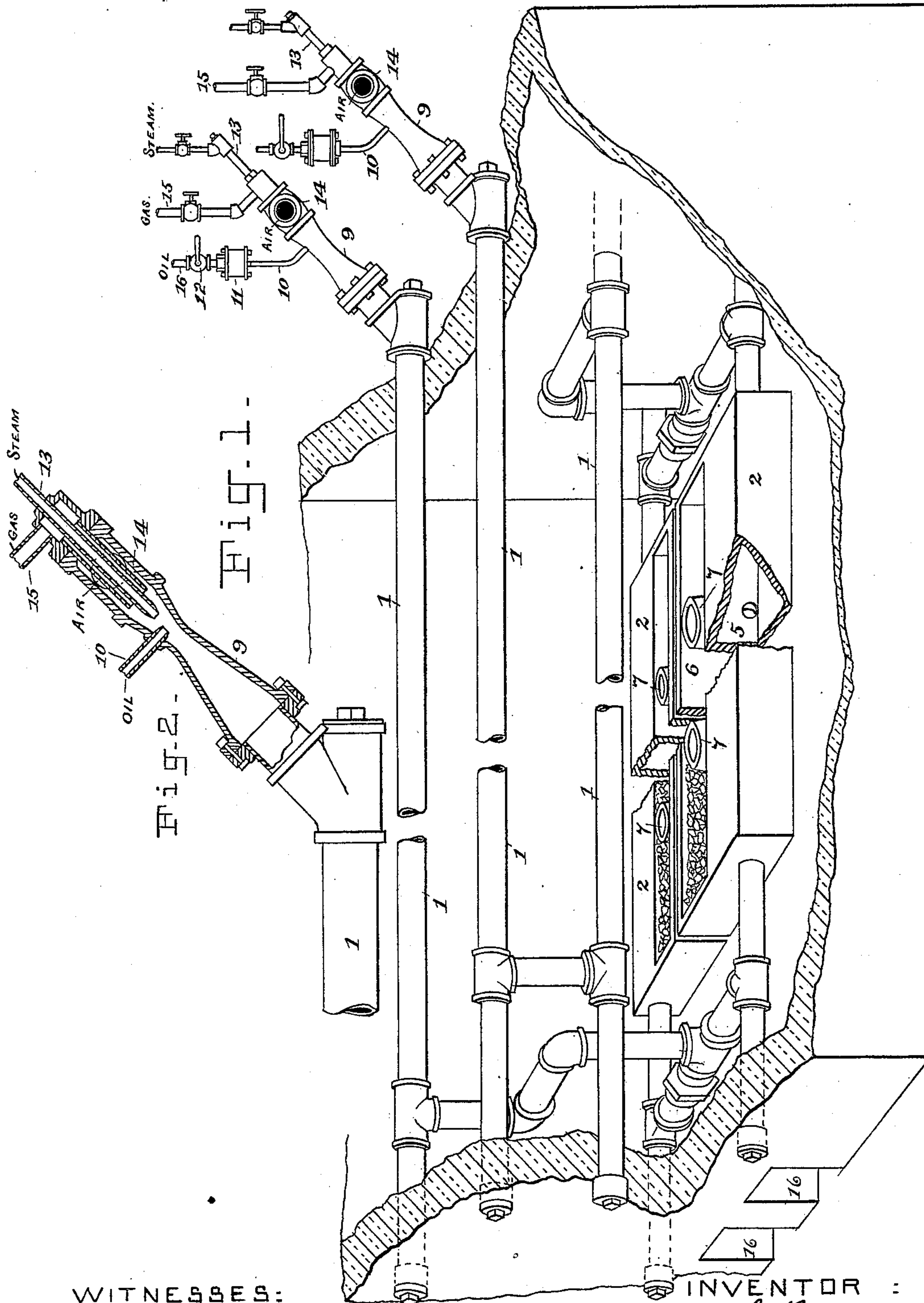
(No Model.)

2 Sheets—Sheet 1.

J. S. ROGERS.
GAS GENERATOR AND BURNER.

No. 471,361.

Patented Mar. 22, 1892.



WITNESSES:

E. B. Bolton
C. L. Davis

INVENTOR :

James S. Rogers

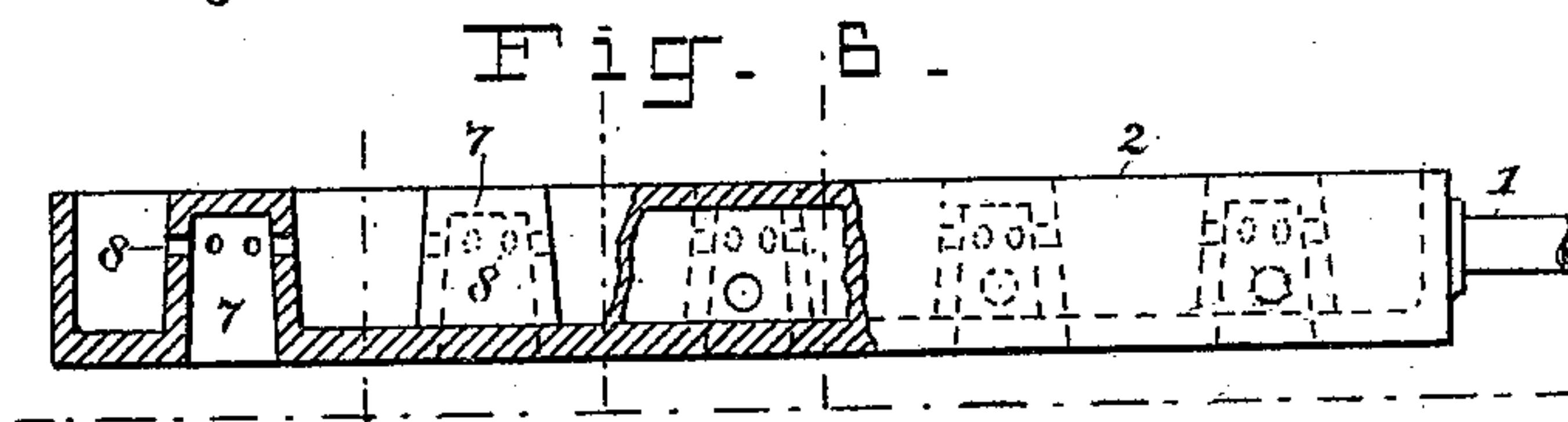
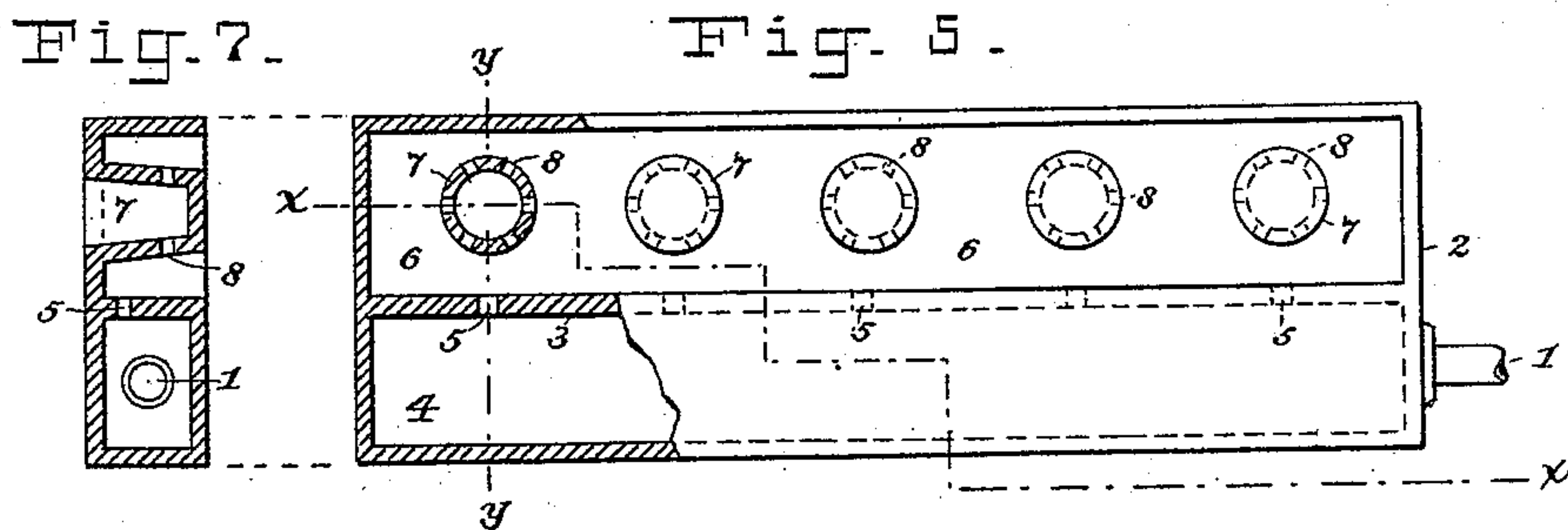
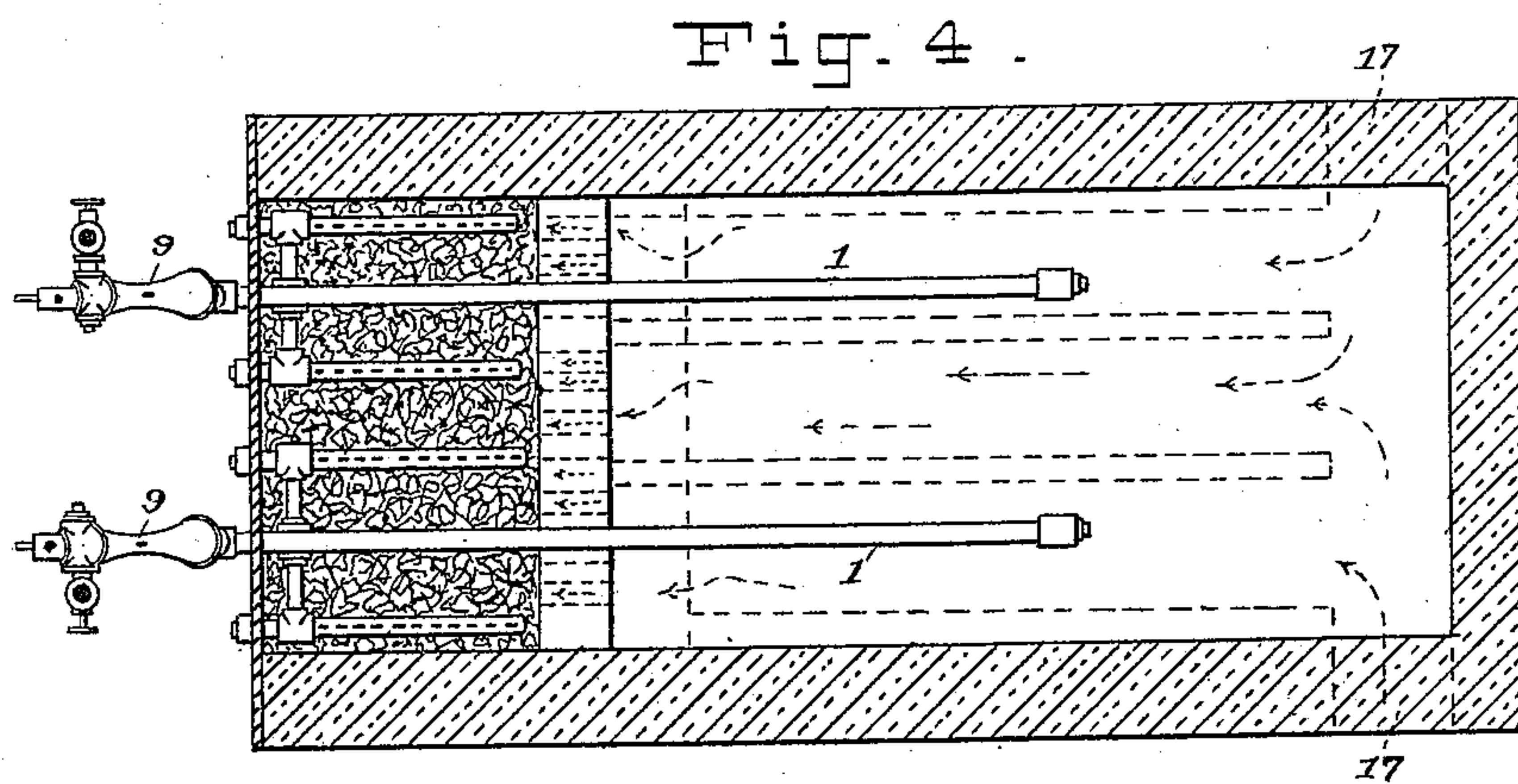
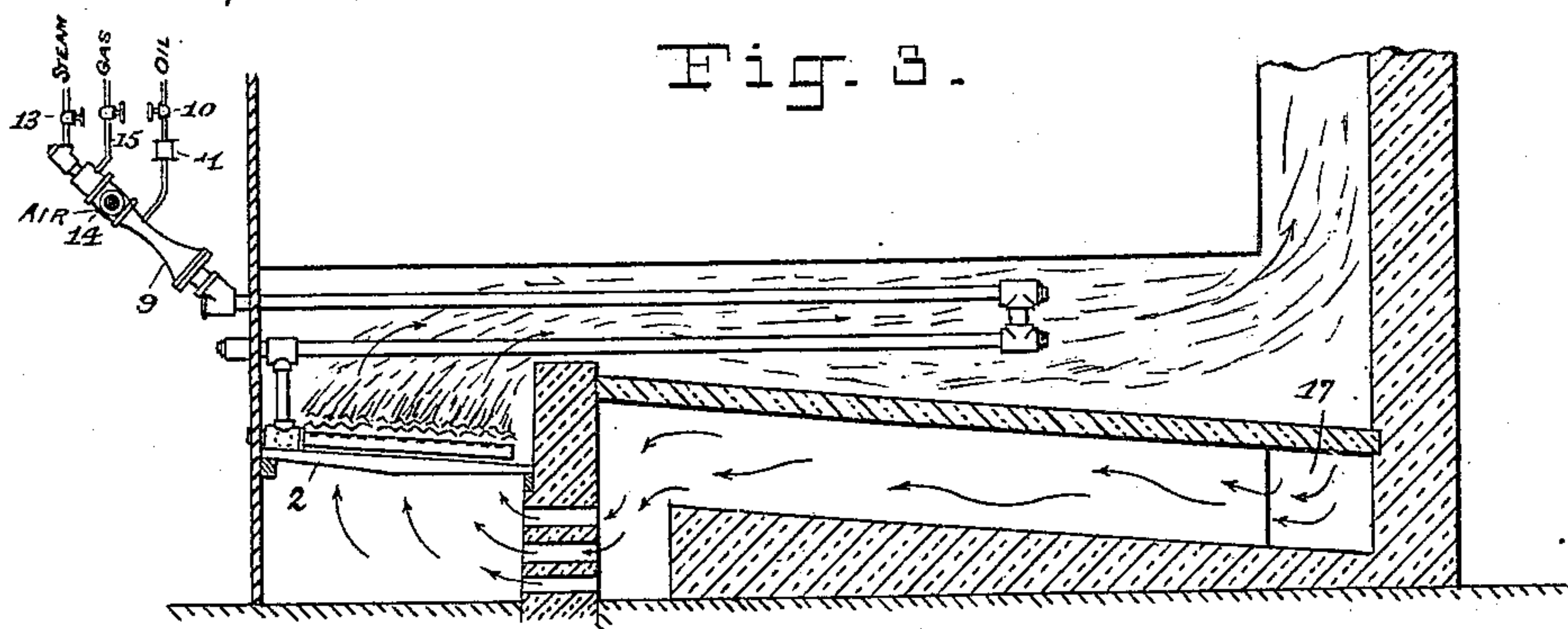
By

Marble Maron Canfield,
Attorneys.

J. S. ROGERS.
GAS GENERATOR AND BURNER.

No. 471,361.

Patented Mar. 22, 1892.



WITNESSES:

E. B. Kolton
C. L. Davis

INVENTOR :

James S. Rogers
By *Marble, Mason & Canfield*
Attorneys.

UNITED STATES PATENT OFFICE.

JAMES S. ROGERS, OF SARATOGA SPRINGS, NEW YORK.

GAS GENERATOR AND BURNER.

SPECIFICATION forming part of Letters Patent No. 471,361, dated March 22, 1892.

Application filed January 16, 1891. Serial No. 377,991. (No model.)

To all whom it may concern:

Be it known that I, JAMES S. ROGERS, a citizen of the United States, residing at Saratoga Springs, in the county of Saratoga and State of New York, have invented a certain new and useful Improvement in Gas Generators and Burners; and I do hereby 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, forming part hereof.

This invention consists of an improved apparatus for generating gas and burning the same in a furnace for any desired purpose, as in a gas-retort furnace or under a boiler for the generation of steam, or for the purpose of producing a high degree of heat wherever the apparatus is applicable.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, wherein similar reference-numerals designate like or equivalent parts wherever found throughout the several views, and in which—

Figure 1 represents a partial perspective of an ordinary gas-retort furnace provided with my improved apparatus, parts of the furnace being broken away to more clearly show the construction; Fig. 2, a detail thereof, partly in section. Fig. 3 shows in central vertical section a boiler-furnace with my improved apparatus applied thereto, and Fig. 4 is a plan view of the arrangement of the apparatus shown in Fig. 3. Fig. 5 is a plan view of one of the burners, parts being broken away; Fig. 6, a side view thereof, partly in section, on the line *xx* in Fig. 5; and Fig. 7 is a section on the line *yy* of Fig. 5.

Referring to Fig. 1 of the drawings, the pipes 1 constitute a retort for the generation of gas. These pipes may be of any size, length, and number, according to the amount of gas required for the combustion-chamber, and they may be placed in any convenient position within the same.

At the bottom of the fire-chamber or furnace and in the position usually occupied by the grate are placed box-shaped burners 2. (Shown in Fig. 1 and in detail in Figs. 5, 6, and 7.) These burners are divided longitudi-

nally by a partition 3. The chamber 4 on one side of this partition being closed, except as hereinafter described, constitutes in effect a continuation of the retort-pipe 1, and these chambers 4 are in communication by means of perforations 5 in the partition 3 with chamber 6 on the opposite side of the partition 3. This chamber 6 has no top, and at intervals therein and preferably opposite the perforations 5 are formed thimbles or tubes 7, which are open at the bottom and provided in their side walls with perforations 8. If preferred, the tops of these thimbles or tubes may be left open, as shown in Fig. 1, and the perforations 8 omitted. These burner-boxes 2 may be made of any desired fire-proof material, as iron, fire-clay, crucible material, &c. The space within chamber 6 not occupied by the thimbles or tubes 7 is filled in with small pieces of broken fire-brick (shown in Fig. 1) or other refractory substance, and the chambers 4 with the perforations 5 serve as means for distributing the gas through this broken material.

To operate this apparatus a fire may be started in the fire-chamber to heat the retort, being made of wood thrown directly on the burner, or a fixed gas may be injected into the retort and thence to the burner, as hereinafter described. After the retort becomes hot, crude oil may be admitted thereto, when it will be immediately converted into gas and pass to the burner 2.

The preferred means for injecting gas into the retorts to start the fire in the burner 2 and of supplying oil after the retorts have been heated, as hereinafter described, consists of the following described constructions: Communicating with the retort-pipe 1, or with each of them, if more than one be employed, and outside of the furnace-walls is a mixer or fuel-supply 9. (Shown in section in Fig. 2.) The oil is supplied by a pipe 10, provided with a sight-glass 11 and valve 12. The oil-pipe 10 is adjusted at right angles to a steam-jet pipe 13 and in close proximity to it, so that the oil is drawn by the steam-jet through the small opening in the pipe 10 and instantly atomized and thrown by the steam into and through the retort-pipes. Air is also admitted to the injector at 14, and is thus mixed with the steam and oil, and if desirable for

any purpose gas can also be admitted at 15, together with the air, oil, and steam. The oil thus thrown with the air and steam into the retort-pipes, is heated by the burners 2 to a high degree, and continuing with the decomposed steam it issues through the holes 5 in the partitions 3 in gaseous form, and flowing among the broken fire-bricks in the chamber 6 it mingles with hot air rushing through the perforations 8 in the thimbles or tubes 7, burns without smoke, producing an intense heat and utilizing all the carbon in the most economical manner. The air, preferably heated in any well-known manner, is admitted to the thimbles or tubes 7 through flues 16, which are in communication with said thimbles or tubes below the burners.

In case it is desired to start the fire in the burners 2 and heat the retort with gas before turning on the oil, as hereinbefore described, it is only necessary to turn on the gas through pipe 15, the oil and steam supply being cut off, and ignite the gas at the burners 2.

In Figs. 3 and 4 I have shown my retort gas generator and burner as applied to the fire-chamber of steam-boilers, where the ordinary grate-surface is used instead of the box-burners 2, the broken fire-brick or equivalent material being placed upon the grate over the burner, which in this case may be of any preferred construction, though it is evident that I may employ the box-burner hereinbefore described, if necessary. In this application of my improved burner air is admitted at 16 and passes either through flues made under the boiler, as shown, or through hollow walls to the ash-pit, which is kept closed in front. It will be observed that one of the retort-pipes in Fig. 1 communicates with the burners 2 at one end of the furnace and the other by means of a return branch with the burners 2 at the other end. This arrangement is immaterial, however, and it is evident that the burners may extend the full length of the furnace and that many other changes in the construction, arrangement, and combination of the various parts of my improved gas generator and burner may be made without departing from the scope of my invention, and I do not limit myself to the exact form thereof herein shown.

Having fully described my invention, its construction and operation, I claim and desire to secure by Letters Patent the following, viz:

1. A gas generator and burner for furnaces, consisting of a retort within the furnace, means for injecting oil into the retort, and a burner consisting of a box, as 2, having separate compartments, one of which is in communication with the retort and the other filled with broken fire-brick or other refractory material, into which the gas is discharged, substantially as shown and described.

2. A gas generator and burner consisting of a retort provided with means for injecting oil therein and a burner consisting of a box, as 2, having separate compartments, one of which is in communication with the retort and the other filled with broken fire-brick or other refractory material, into which the gas is discharged and in which air is mingled with the gas, substantially as shown and described.

3. The combination, with a retort within a furnace, of a burner consisting of the box 2, having a chamber, as 6, with which the retort communicates, and an open-top compartment filled with broken refractory material, and means for mingling gas and air with the refractory material, substantially as shown and described.

4. A gas-burner for furnaces, consisting of a box, as 2, having chambers 4 and 5, separated by a perforated partition 3, one of said chambers being open at the top and provided with thimbles or tubes 7, substantially as shown and described.

5. In a gas generator and burner for furnaces, the combination, with the furnace, of a burner, a retort in communication therewith, a mixer and injector provided with oil, gas, steam, and air supply pipes in communication with the retort, and means for independently controlling the admission of the oil, gas, steam, and air, substantially as shown and described.

Signed at Saratoga Springs, in the county of Saratoga and State of New York, this 14th day of January, A. D. 1891.

JAMES S. ROGERS.

Witnesses:

WINSOR B. FRENCH,
N. F. GRIFFITH.