

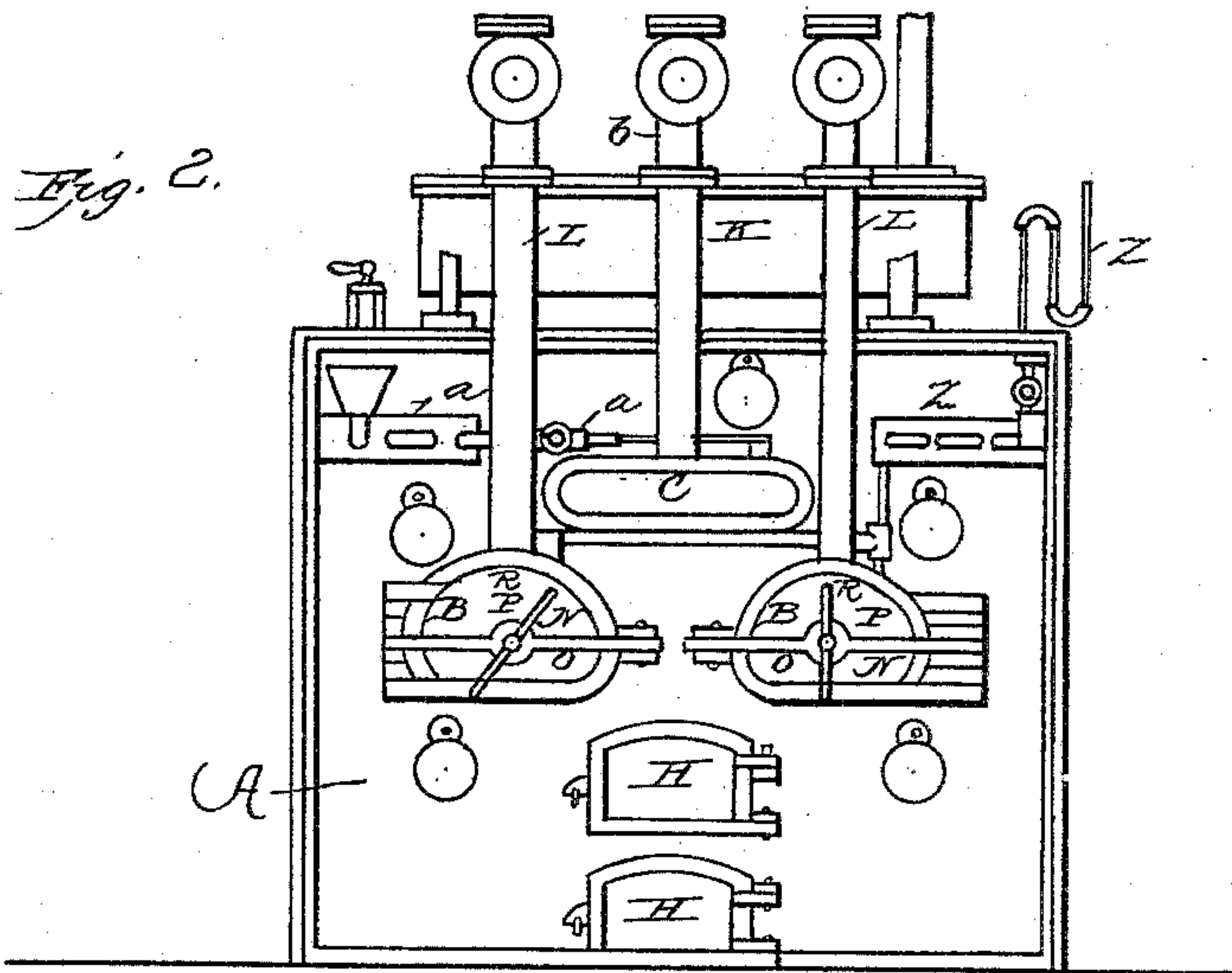
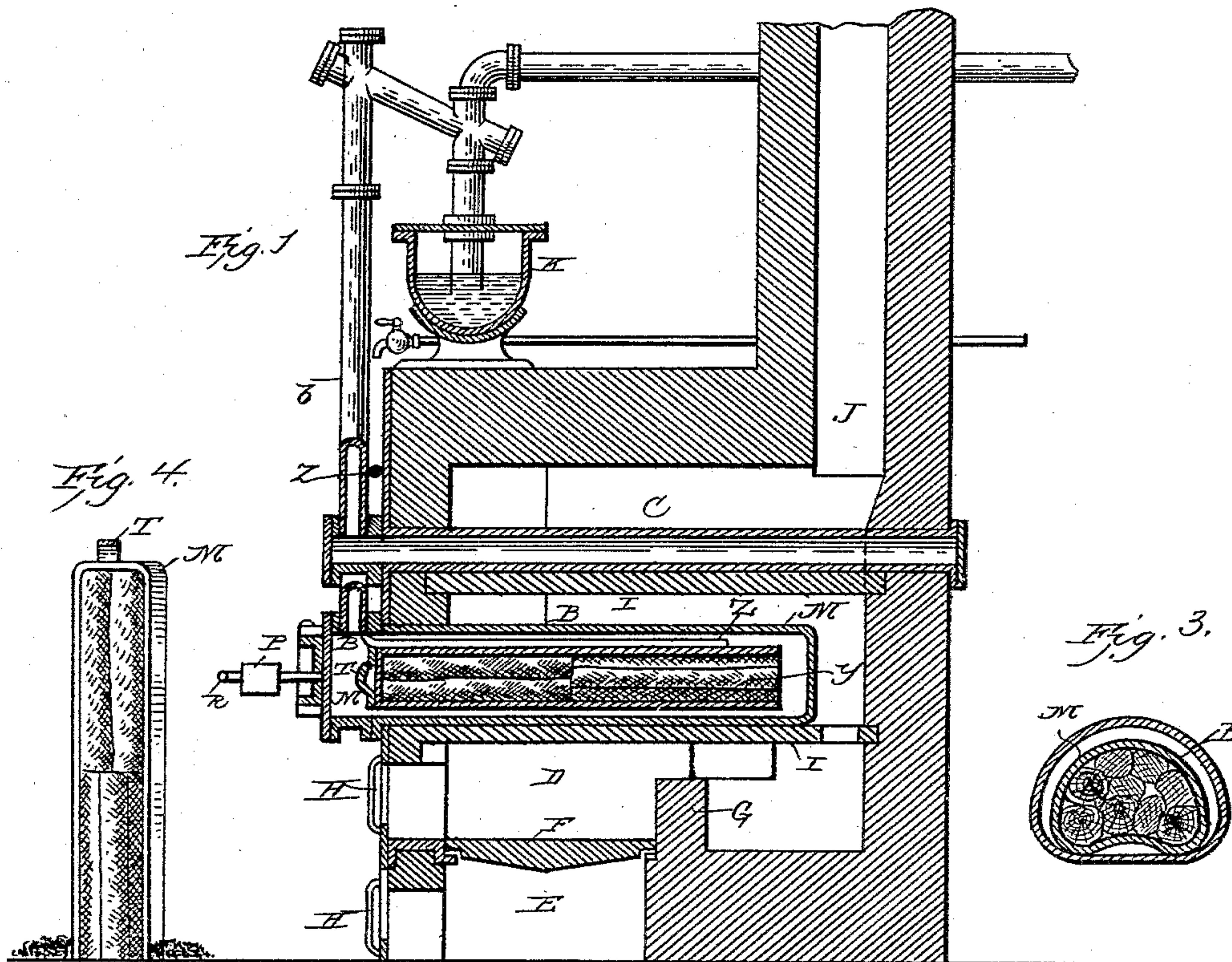
(No Model.)

J. D. AVERELL.

APPARATUS FOR THE MANUFACTURE OF WOOD GAS.

No. 411,850.

Patented Oct. 1, 1889.



WITNESSES
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JOHN D. AVERELL, OF BROOKLYN, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE TORAYA PATENT GAS COMPANY, OF PHILADELPHIA, PENNSYLVANIA.

APPARATUS FOR THE MANUFACTURE OF WOOD-GAS.

SPECIFICATION forming part of Letters Patent No. 411,850, dated October 1, 1889.

Application filed January 17, 1889. Serial No. 296,665. (No model.)

To all whom it may concern:

Be it known that I, JOHN D. AVERELL, of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Apparatus for the Manufacture of Wood-Gas; 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, and to the letters of reference marked thereon, which form part of this specification.

My invention relates to an improved apparatus for generating wood-gas and manufacturing charcoal.

Referring to the accompanying drawings, Figure 1 represents a vertical longitudinal section of a retort-bench. Fig. 2 is a front view of the same on a more reduced scale. Fig. 3 is a cross-section and retort and cartridge. Fig. 4 is a vertical section of a wood cartridge in position while smothering its contents.

In the drawings, A represents a suitable furnace, in which one or more wood-distilling retorts B B are employed, and an oil-retort C, preferably located above the retorts B B.

D indicates the fire-chamber; E, the ash-pit; F, the grate; G, the bridge-wall; and H, the fire and ash-pit doors.

The retorts B and C have beneath them tiles I, for the protection of their bottoms against the intense heat.

The furnace is suitably arched over the retorts to distribute the heat over them, and the top of the rear part of the arch connects with the chimney J of the furnace. The oil-retort C passes through the furnace and has suitable lids on each end which can be readily removed for cleaning the retort. The oil for this retort is heated in the heating-pipe *a*, which is arranged partly in the lining of the furnace and passes the oil several times back and forth in the furnace. Said retort has one central chamber and one to each side of said central chamber, into which two chambers the oil is introduced from said pipe *a*, and from thence into said central chamber, from which the oil-gas passes by means of the

stand-pipe *b* to the hydraulic main K, located on the top of the bench. The gases generated in the wood-retorts pass into the same hydraulic main by means of the stand-pipes L, and all gases contained in the hydraulic main pass through the usual scrubbing process and from there to the holder for use.

The retorts B B have each a suitable mouth-piece N, furnished with a proper jointed door O, strongly hinged to said mouth-piece, and each door is furnished with a hinged pressure-bar P, carrying the pressure-screw R, and a slotted staple or other suitable fastening is provided for the loose end of the pressure-bar. The retorts may be round or of other shape. The D shape is the preferred, as shown.

z represents a steam-pipe, which may be connected direct with a steam-boiler, or it may be connected with a steam-heating or hot-water pipe passing through the lining of the retort-furnace, as shown in Fig. 2. For each retort such a pipe *z* is employed, entering at the mouth-piece and passing to the rear or inner end of the retort to discharge a suitably-regulated amount of steam during the process of distillation and to come in contact with the wood.

In each retort for the charge of wood I employ a solid sheet-metal wood-cartridge M, which has its forward end tightly closed and furnished with a handle T. The rear end of this cartridge is open, and as it is being charged with wood the closed end is held down and the wood inserted from the top into the open end of the cartridge. Relative to the dimensions of the retorts, said cartridge is made smaller to allow the gases generated to pass between the inner side of the retort and over the outside of the cartridge, for which purpose the bottom of the cartridge is made concave to allow a longitudinal passage under it. Said concave portion at the bottom of each cartridge and over the bottom of each retort forms a very hot space, through which the highly-heated gases pass, thereby fixing the same. By means of the steam-pipe *z* the steam is conducted to the wood and disintegrates and softens the solid matters and extracts the same, and in this way assisting beneficially in the generation of the

gas. Relative to the length of the retort, the cartridge is made sufficiently shorter to allow plenty of space for the generated gases to escape from the open end of the cartridge into the rear end of the retort, from where the gases pass forward over the cartridge to the mouth-piece, from which they pass into the stand-pipes to the hydraulic main.

The gases passing close to the highly-heated retort are superheated and fixed by the same before passing from the retort. Several of the cartridges are usually employed to enable the attendant to have a ready-charged cartridge on hand as soon as required. After the gas is extracted from the wood the retort is opened and the cartridge is quickly withdrawn. A flat cover (not shown) is then placed over its open end and the cartridge is placed in sand with its open end down (the flat cover having been removed) to seat said end and exclude the air from the charcoal, so that the charcoal within the cartridge is smothered and saved from consumption and reduction, and consequently is produced in a valuable mercantile condition. The cartridge withdrawn from the retort is immediately substituted by a second cartridge ready charged, and thereupon the retort is closed.

The combination of retort, cartridge, and steam-pipe herein shown and described is not

claimed in the present application, but forms the subject-matter of a patent granted me February 19, 1889, No. 393,306.

What I claim is—

1. A wood-gas generator comprising an imperforate cartridge adapted to receive the wood to be distilled and be removably inserted in a retort, said cartridge constructed of sheet metal having an inner open end, a longitudinally-concaved bottom, and of a size to leave gas-passages and heating-spaces between its open end and its sides and the inner walls of the retorts, substantially as described.

2. In a wood-gas-generating apparatus, a normally-closed retort, in combination with an imperforate wood-receiving cartridge removably located in the retort, said cartridge having its inner end open, through which the cartridge is charged and the gas escapes into the retort, said cartridge forming gas-passages and heating-spaces between its open inner end and walls and the inner walls of the retort, for the purpose set forth.

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

JOHN D. AVERELL.

Witnesses:

CHAS. M. WERLE,
JOSÉ VIVO.