

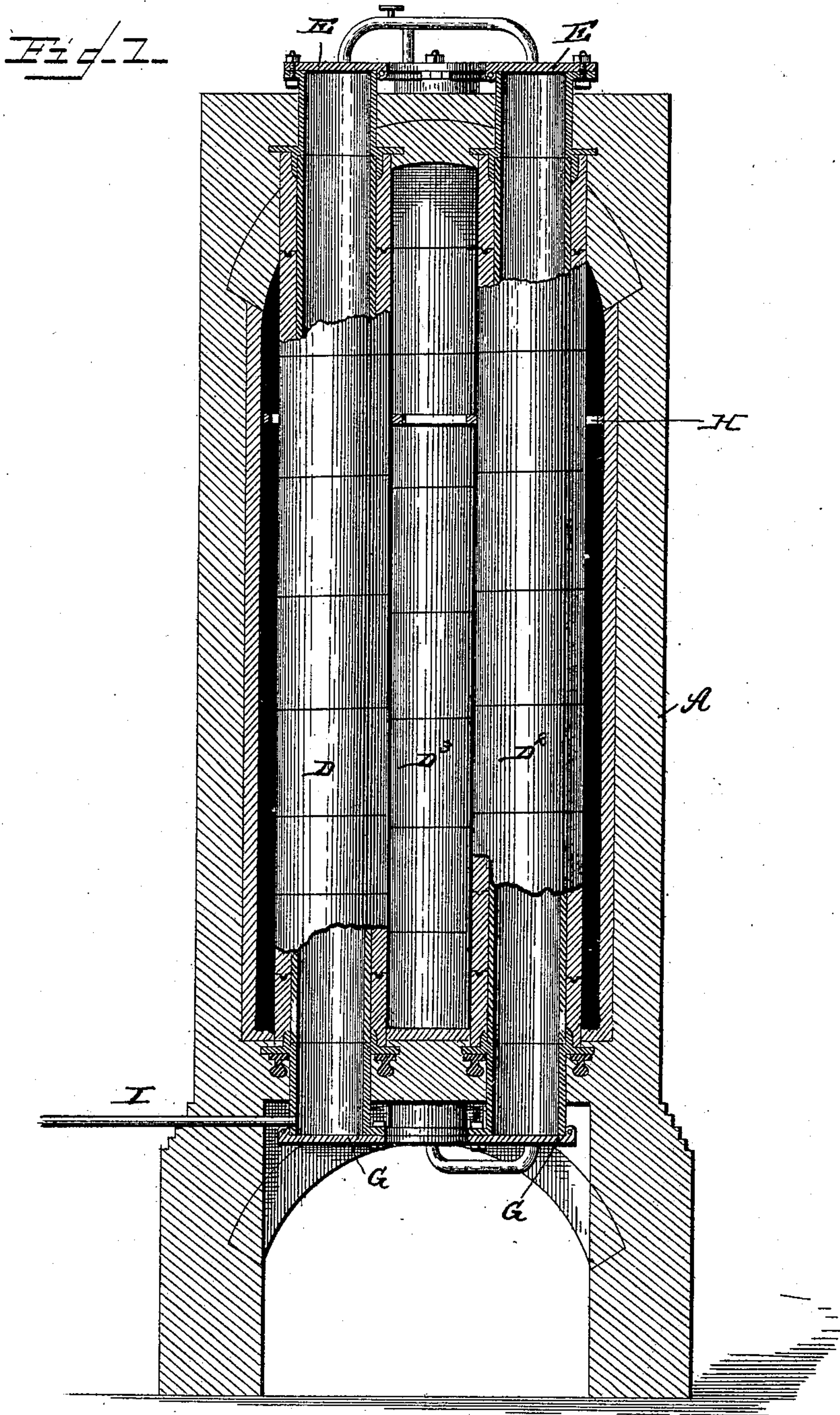
(No Model.)

2 Sheets—Sheet 1.

W. F. M. McCARTY.
APPARATUS FOR THE MANUFACTURE OF GAS.

No. 355,331.

Patented Jan. 4, 1887.



Witnesses

Wm. F. Knutemann

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(No Model.)

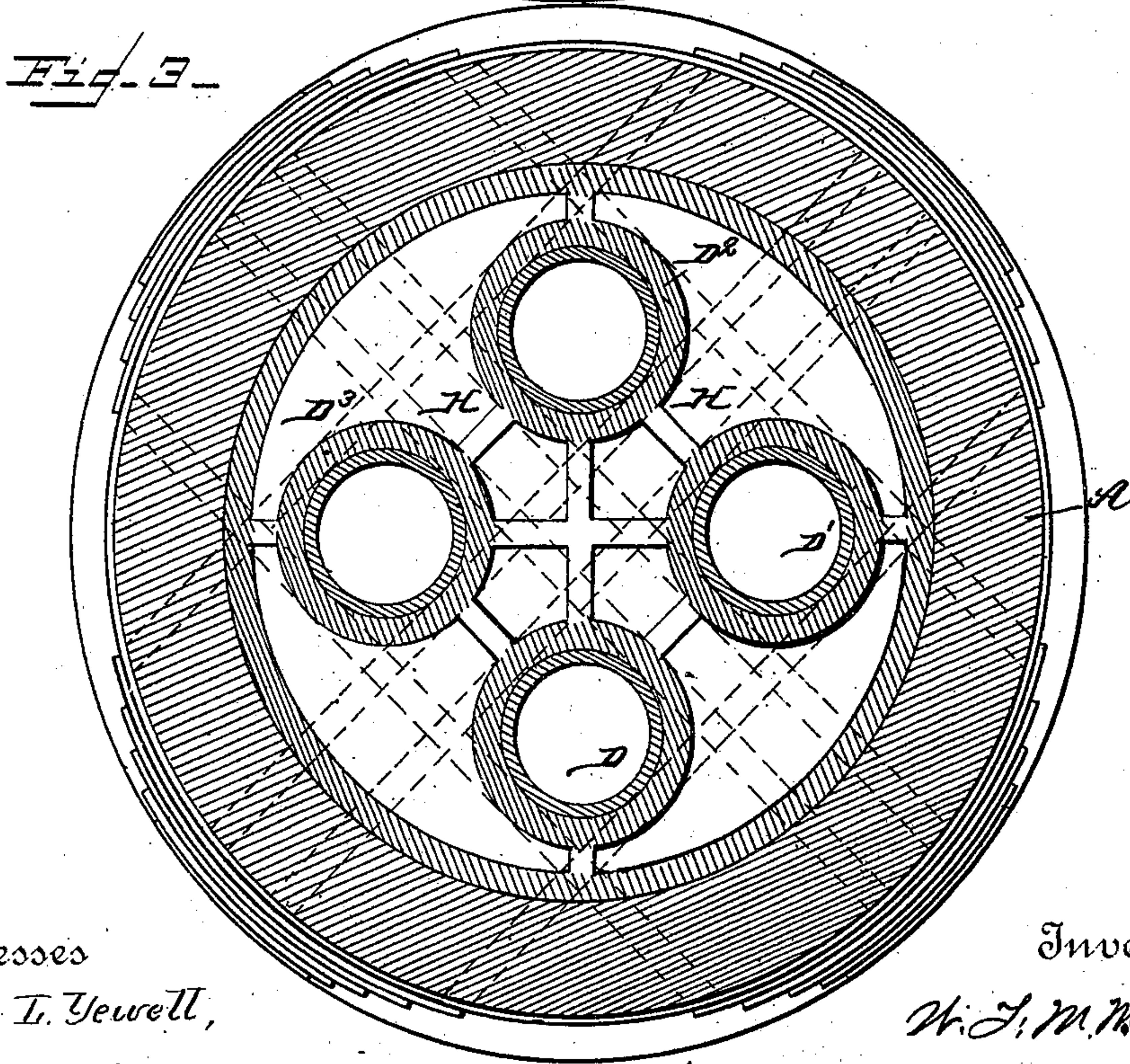
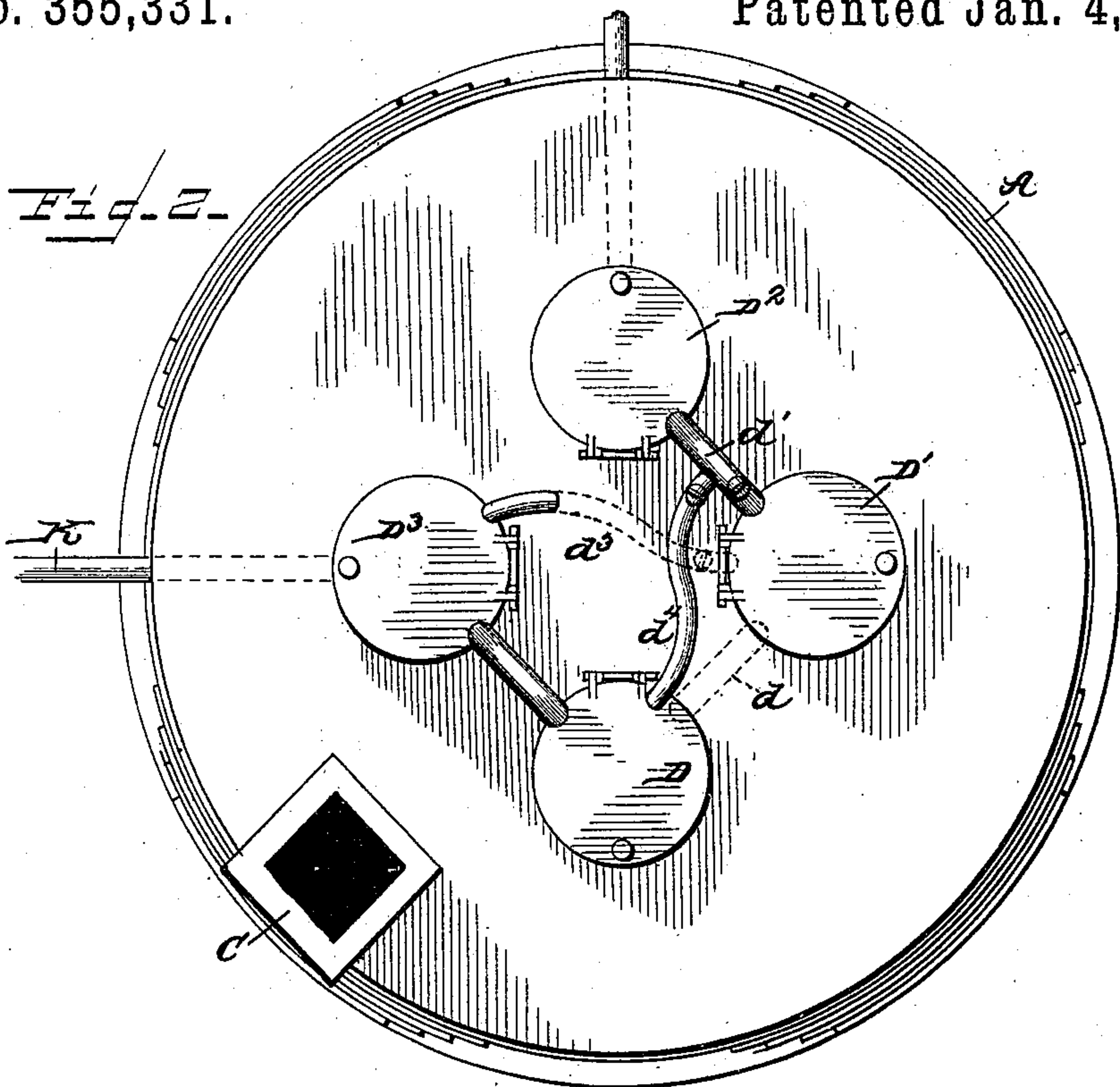
2 Sheets—Sheet 2.

W. F. M. McCARTY.

APPARATUS FOR THE MANUFACTURE OF GAS.

No. 355,331.

Patented Jan. 4, 1887.



Witnesses

Edwin L. Yewell,

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UNITED STATES PATENT OFFICE.

WILLIAM F. M. McCARTY, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR
TO JANE LOGAN, OF HAGERSTOWN, MARYLAND, AND ADOLPH OHL
AND B. C. LAUTH, OF PHILADELPHIA, PENNSYLVANIA.

APPARATUS FOR THE MANUFACTURE OF GAS.

SPECIFICATION forming part of Letters Patent No. 355,331, dated January 4, 1887.

Application filed December 11, 1885. Serial No. 185,379. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM F. M. McCARTY, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia
5 and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for the Manufacture of Gas, of which the following is a specification, reference being had therein to the accompanying drawings.

10 My invention relates to certain improvements in apparatus for the manufacture of water-gas.

My invention consists, essentially, in the construction of the furnace and retorts, both of
15 which are built up of fire-brick, lined with fire-clay, the retorts being supported in the furnace by tie-braces suitably secured or built in the walls of the same.

The form and arrangement of the furnace
20 and retorts may be varied indefinitely to suit the requirements of various conditions; but in order to clearly explain the nature and scope of my invention, reference is made to the accompanying drawings, showing one form of ap-
25 paratus by means of which my invention may be practiced.

In the said drawings, Figure 1 represents a vertical sectional view of a furnace, showing the retorts located therein, with portions
30 broken away to expose the interior. Fig. 2 represents a top view of the retorts and furnace, showing the induction, eduction, and connecting-pipes of the retorts, and the respective valves of said pipes; and Fig. 3 represents a horizontal sectional view of the fur-
35 nace and retorts.

The letter A indicates a furnace which, in the present instance, is represented as cylindrical in shape, and B is the door entering the
40 lower part of the furnace, through which the contents of the retorts may be removed.

C is the smoke-escape flue, which leads to a suitable chimney or stack.

The letters D D' D² D³ indicate a series of
45 retorts which are constructed of fire-brick, built up in sections, which are tongued and grooved together, as shown, located in the interior of the furnace, and are lined with fire-clay or other refractory material. The upper
50 ends of the retorts are formed with flanged tops

having man-holes, which are closed by the covers E, held on in any suitable manner, so as to form a tight joint, but permit the retorts to be readily opened for charging. The lower ends of the retorts are provided with pivoted drop-
55 bottoms G, which may be let down when required, so as to open the lower ends of the retorts and discharge the contents of the same when exhausted or otherwise rendered useless. The upper portions of the retorts are built in
60 the crown of the furnace, as shown in Fig. 1 of the drawings, and at suitable points below are braced by cross-ties H, which are secured or built into the side walls of the furnace, so
65 as to securely hold the retorts in a vertical position.

The induction-pipe I enters the lower part of the retort D. The said retort connects at its top with the upper part of the retort D'. The
70 said retort D' connects at its bottom with the lower part of the retort D², and the retort D² at its top with the retort D', by means of the pipes d d' d².

The letter K indicates the eduction-pipe leading to the main or gas holder. The re-
75 torts D' and D³ are connected at the top by the pipe d³, and the retorts D and D² by a pipe, d⁴, which are provided with valves, for the purpose hereinafter more fully explained.

The retort D is charged with broken stone,
80 fire-tiles, fire-brick, or any other similar radiating material for the purpose of superheating the steam and gases which are passed into said retort during the process of manufacturing the permanent gas. The retorts D' and D²
85 are filled with iron scrap to decompose the superheated steam, and the retort D³ receives the hydrocarbon, which may be either liquid or solid, and charged into the same in the form of spray, vapor, or gas to enrich the
90 gases passing from the retort D' previous to the formation of the resultant illuminating-gas. The steam in passing into the retort D is superheated, as above stated, in the retorts D' D², which are heated to a cherry-red heat. It
95 is deoxidized, liberating pure hydrogen gas and an oxide of iron represented by the formula Fe₃O₄. The hydrogen passes onto the retort D³, where it meets with the carbon, either solid or liquid, in the form of benzine, pref- 100

erably volatilized, in contact with heat or by evaporation by a current of air or heated gas, the whole being converted into a permanent gas in said retort D³ by passing into intimate contact with the heated material, which may be fire-brick, tile, pumice-stone, or other similar substance with which said retort is charged.

When natural gas is employed in conjunction with the other materials for the production of a permanent heating or illuminating gas, the retort D¹ is charged with charcoal, coke, or other suitable solid carbon, and in conjunction with the steam and natural gas in said retort are formed carbonic oxide (CO) and carbureted hydrogen. The gases are then run into the retort D², the iron taking up the oxygen of the carbonic oxide, setting free the carbon which is taken up by the gas, which is still further carbureted in the retort D³, if necessary, by means of a suitable liquid hydrocarbon in the form of spray, or in a gaseous condition, the gases being finally fixed in this retort and converted into a permanent illuminating-gas.

If the compound gas is to be used as a heating agent simply, the final carbureting may be omitted, and the gas for heating the furnace for the manufacture of illuminating-gas is preferably employed before such carbureting.

The furnace is heated by means of a series of

gas jets or burners arranged in a pipe leading to the gas holder or main in any suitable manner, or it may be heated from an ordinary coal-furnace.

As represented in the present instance, a series of four retorts are employed; but it is evident that they may be decreased or increased in number, or their form or position changed, without altering the character of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, in an apparatus for the manufacture of gas, of a furnace and a series of retorts built up of fire-brick and lined with fire-clay or other refractory impervious material, substantially as specified.

2. The combination, in an apparatus for the manufacture of gas, of a furnace and a series of retorts built up of fire-brick, lined with fire-clay or other refractory material, and the brace-ties whereby the retorts are braced and supported, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WM. F. M. McCARTY.

Witnesses:

WM. H. SIMS,

S. E. CAROTHERS.