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Apparatus for the Manufacture of Gas.

No. 156,424. Patented Nov. 3, 1874.

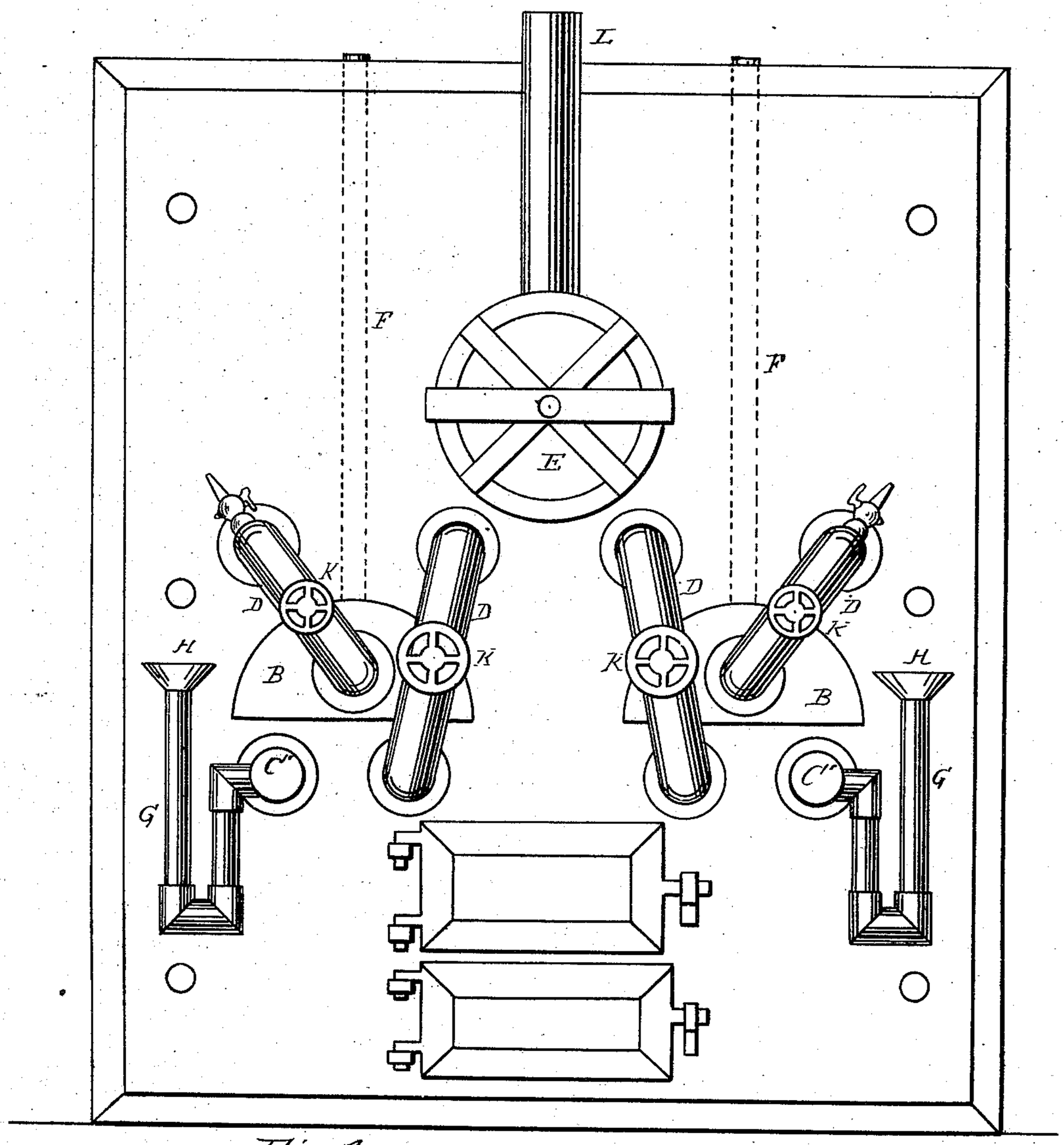

Fig. 1.

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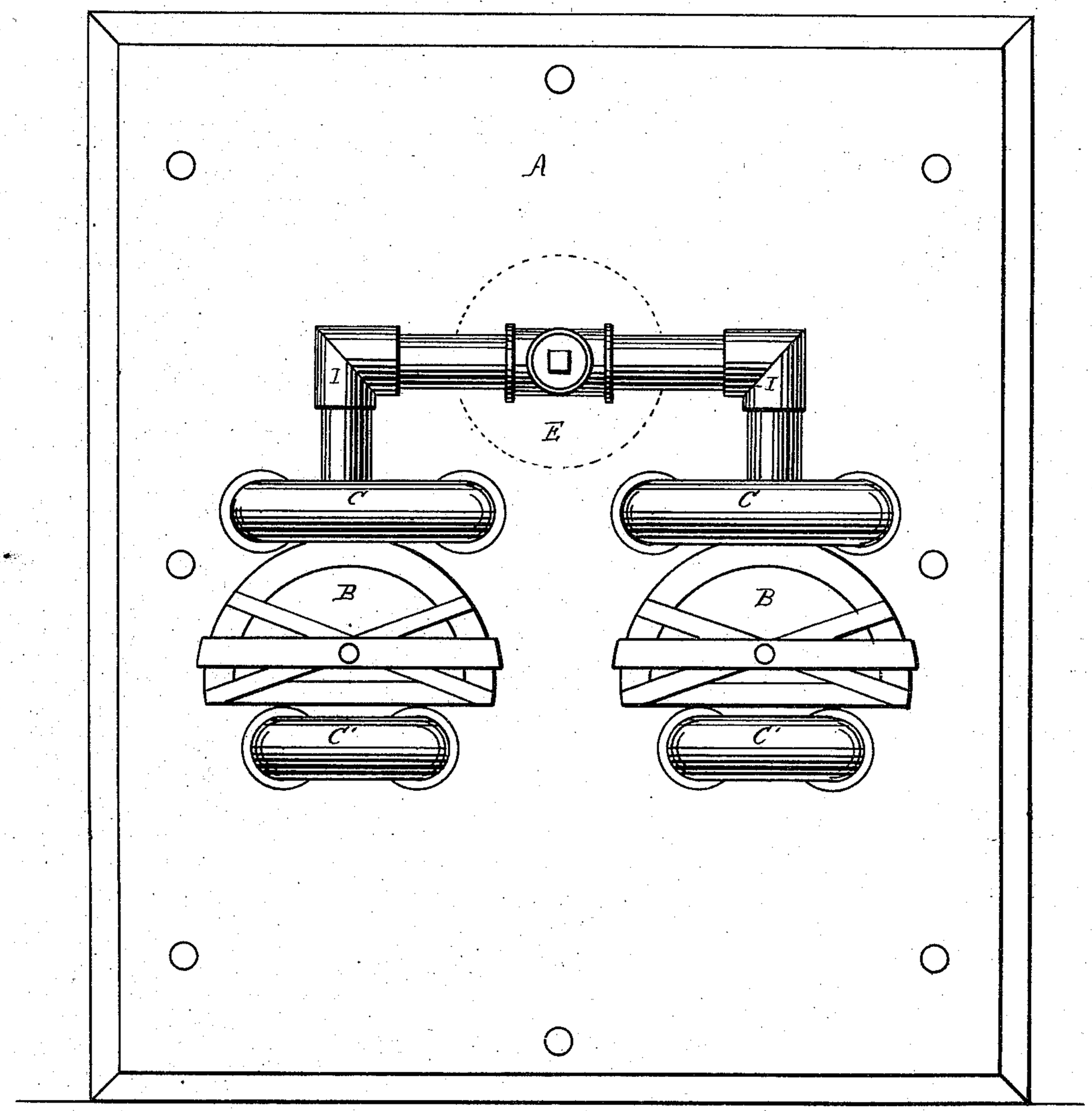

Fig. 2.

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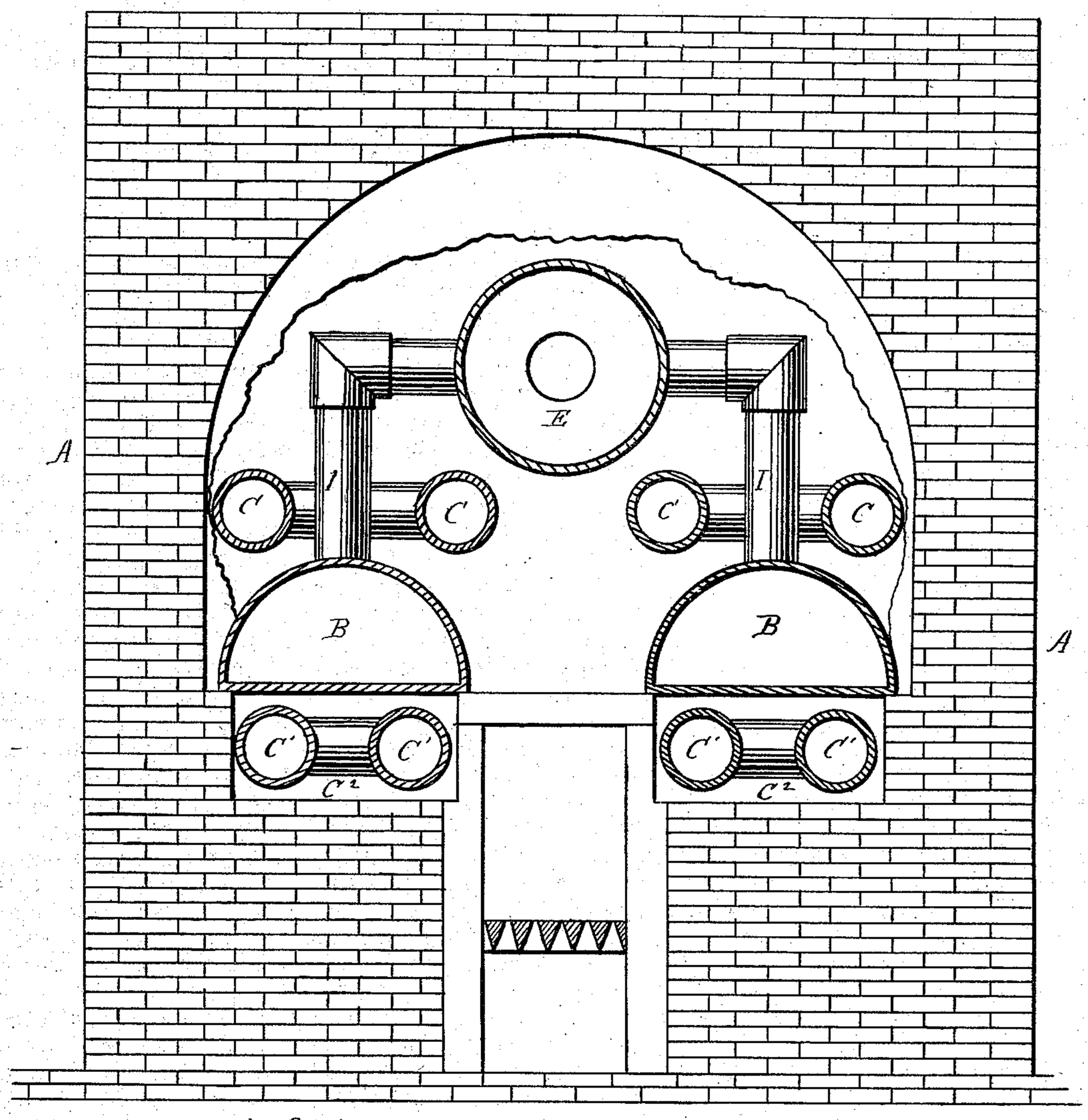

Fig. 3.

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UNITED STATES PATENT OFFICE.

FERDINAND KING, OF NEW YORK, N. Y.

IMPROVEMENT IN APPARATUS FOR THE MANUFACTURE OF GAS.

Specification forming part of Letters Patent No. **156,424**, dated November 3, 1874; application filed October 8, 1874.

To all whom it may concern:

Be it known that I, FERDINAND KING, of the city, county, and State of New York, have invented certain Improvements in the Manufacture of Gas and Apparatus therefor, of which the following is a specification:

My invention relates to certain improvements in that class of gas apparatus in which a rich illuminating-gas is manufactured by decomposing liquid hydrocarbons in the presence of pure hydrogen gas, and converting the mixed gases into a permanent and fixed gas by intense heat.

My invention consists in a new and improved arrangement of the steam-generating and decomposing tubes, whereby the steam is quietly generated from water in the same at a comparatively low temperature, and then subjected to an intense heat in the presence of iron filings or turnings or other metal capable of decomposing water, absorbing its oxygen, and liberating the hydrogen gas. Second, in the combination with said tubes, constructed and arranged as described, of a retort or series of retorts, in which the hydrocarbons are decomposed, and a superheater in which the mixed gases and vapors from the retort are finally converted by intense heat into a permanent gas, as will be fully hereinafter described.

In the drawings, Figure 1 represents a front elevation of my improved apparatus; Fig. 2, a back elevation of the same; and Fig. 3, a transverse vertical section of the same.

A represents a furnace constructed of brickwork or other suitable material in the usual manner, and B B the retorts forming the bench, which may be of clay, iron, or any other suitable material. C C represent the steam-generating and decomposing tubes or pipes, a series being provided for each retort of the bench. Said pipes extend from the front of each retort backward to the rear, where they are bent and carried forward to the front, and are then bent upward and carried to the rear of the retort, and then to the front as before, where they are connected to the retort, as shown in Fig. 1. The two lower pipes C^1 C^1 of each series are set in flues C^2 C^2 at each side of the fire-chamber of the furnace away from the direct action of the fire. The upper pipes C C of the series are set immediately over the retorts in the hottest part of the furnace, and subject to the direct action of the fire. The water enters the lower series first, where it is converted quietly into steam at a comparatively lower temperature, which is then passed into the upper series, where it is decomposed by the agency of the iron filings, liberating pure hydrogen gas, which passes on to the retorts. Said pipes are filled with iron filings or other substance capable of decomposing water or steam at a high temperature, and the retorts are filled with coke, coal, charcoal, or other carbonaceous material. Above the retorts, and communicating with them by means of the pipes I I, is a superheater, E, into which the mixed gases from the retorts are passed, and in which they are combined and converted into a fixed incondensable gas. The superheater consists of a cylindrical vessel set in the furnace above and between the retorts, immediately over the fire in the hottest part of the furnace, in order that it may become thoroughly heated. It is generally constructed of iron, and is set in collars or bearings at the front and rear of the furnace in such a manner that it may be freely turned when desired, in order to bring a new portion to the action of the fire when any part of said superheater may become worn or injured by the action of the heat. By this means I am enabled to use the heater much longer than could otherwise be done, as the intense heat wears it very rapidly wherever subjected to its action. The petroleum or other hydrocarbon liquid is admitted to the retorts by means of the pipes F F extending upward through the top of the furnace. These pipes should be provided with traps and funnels in the ordinary manner, similar to those shown by the letters G and H, in order to admit the hydrocarbon, and at the same time prevent the escape of gas from the retorts. The water is admitted to the steam-tubes C C by means of pipes G G, provided with funnels H H, and bent to form traps, as shown, to prevent the escape of steam or gas. The pipes D D, by means of which the pipes C C are connected, are provided with cocks K K, by means of which the quantity of gas admitted to the retorts may be regulated. The gas passes from

the superheater to the main through a pipe, L, extending through the top of the furnace.

The operation of my apparatus is as follows: The fire being started in the furnace, water is admitted to the tubes C C through the pipes G G, where it is transformed into steam. The iron filings in the tubes immediately decompose, the steam liberating pure hydrogen gas which passes on to the retorts. While this is taking place carbureted-hydrogen gas will be generated in the retorts from the petroleum or other hydrocarbon liquid, which is admitted through the pipes F F. The two gases pass out of the retorts through the pipes I I into the superheater E, in which they are thoroughly commingled and combined, and converted by the intense heat to which they are subjected into a fixed, permanent, and incondensable gas, which passes off through the pipe I to the gas-holder.

What I claim is—

1. The generating and decomposing pipes, composed of an upper series, C C, in which the steam is decomposed, and a lower series, C^1 C^1, in which the steam is generated, in combination with the retorts B B, the whole constructed and arranged as herein described.

2. The combination of the steam-generating pipes C^1 C^1 located in the flues C^2 C^2, and decomposing-pipes C C located above the retorts B B, with said retorts B B and superheater E, substantially as and for the purpose herein described.

Witnesses: FERDINAND KING.
CHAS. L. COOMBS,
HERM KÖNIG.