

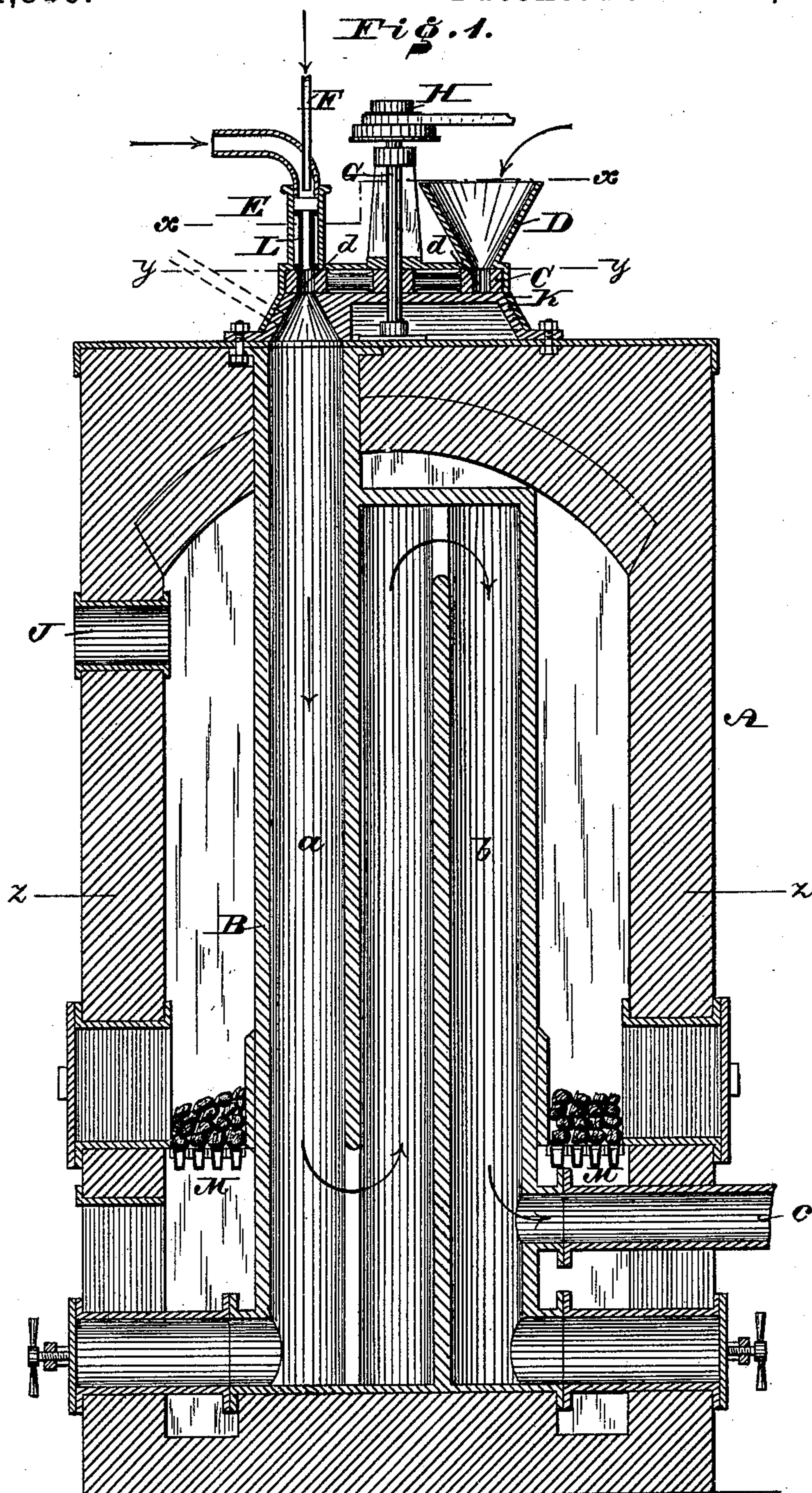
(No Model.)

2 Sheets—Sheet 1.

W. G. BEDFORD.
APPARATUS FOR GENERATING GAS.

No. 404,886.

Patented June 11, 1889.



WITNESSES:

Theo. Rollé.
A. P. Jennings.

INVENTOR:

William G. Bedford
BY *Diederheim & Kuntze*

ATTORNEYS.

(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

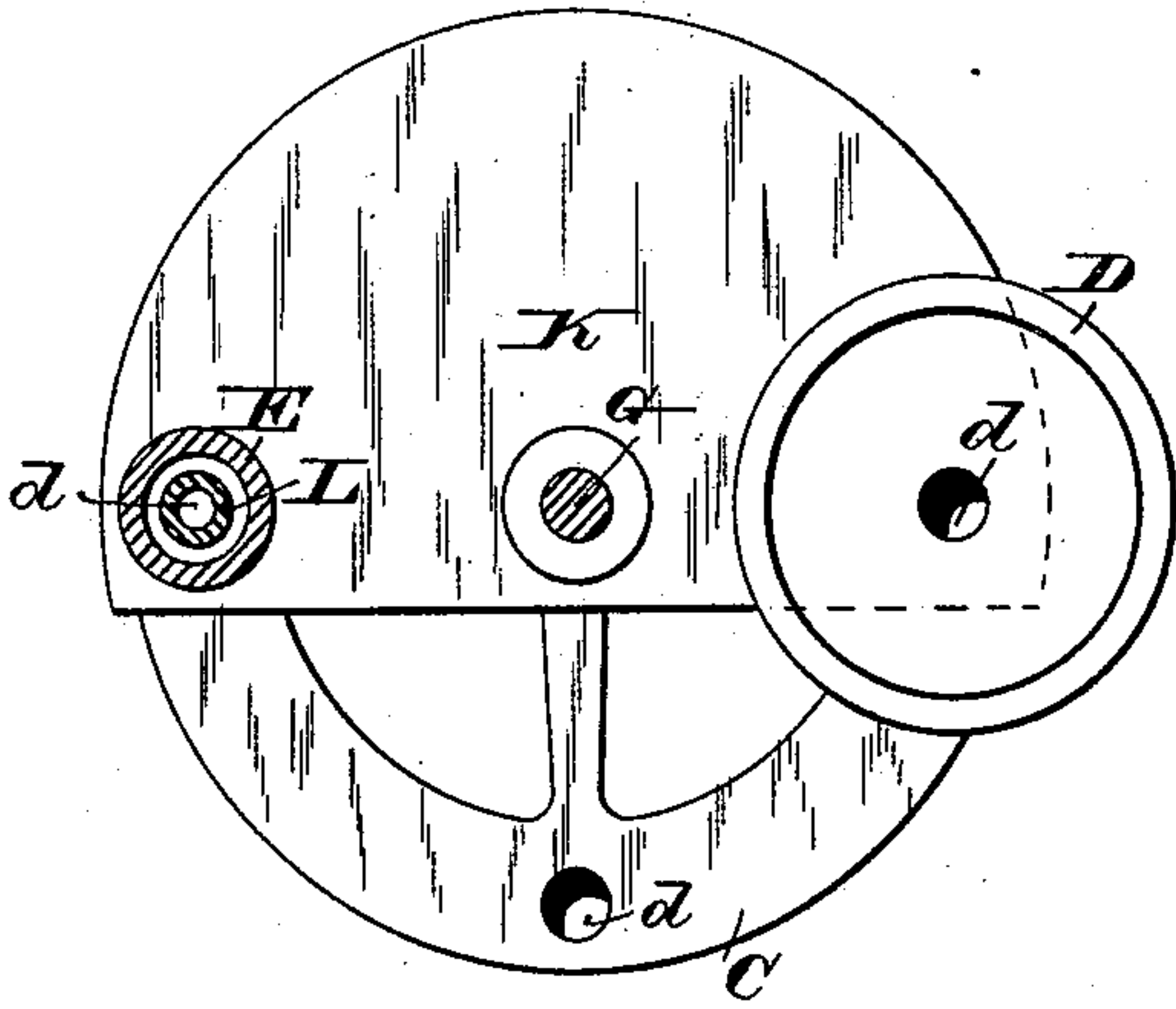


Fig. 3.

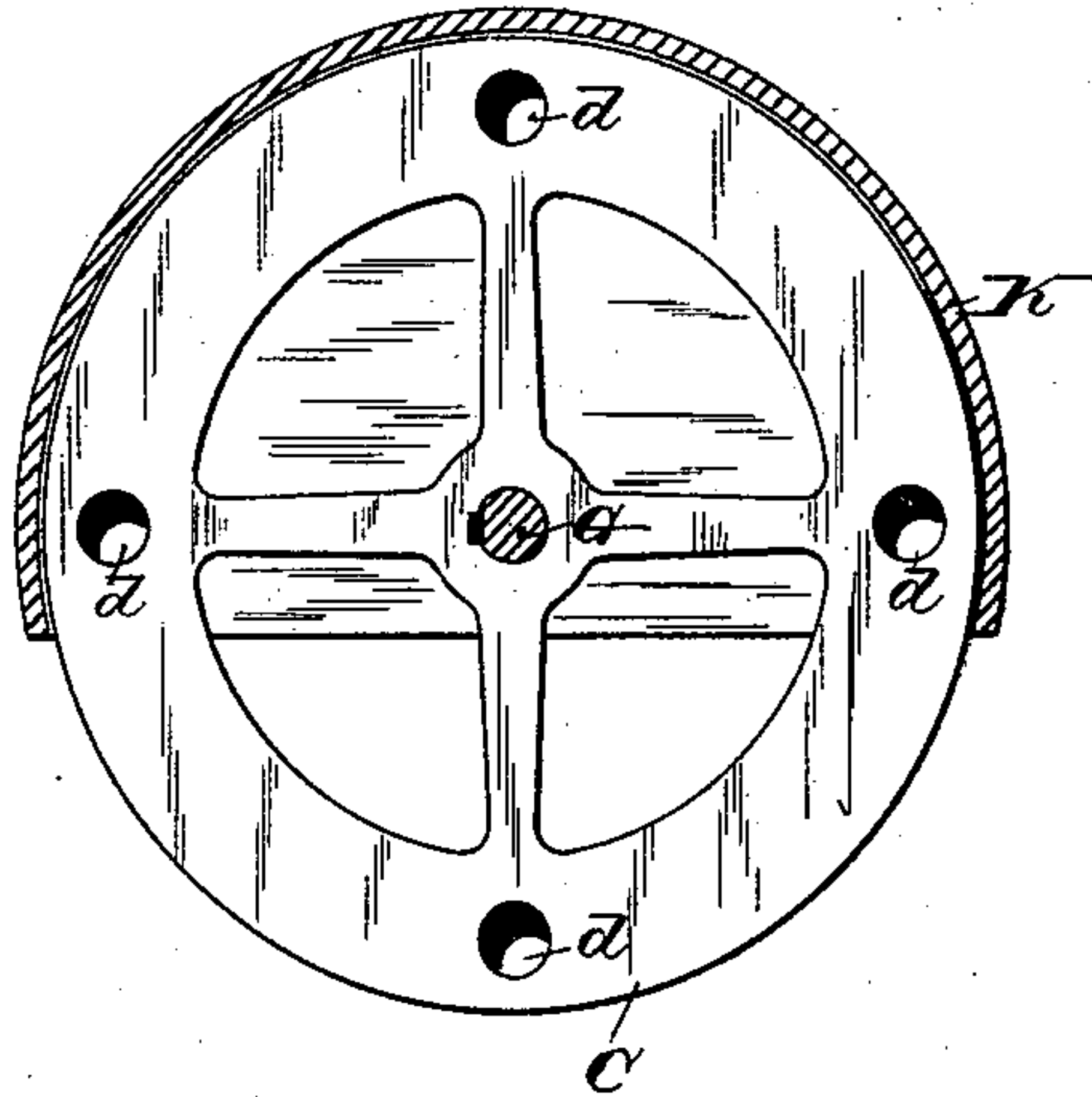


Fig. 4.

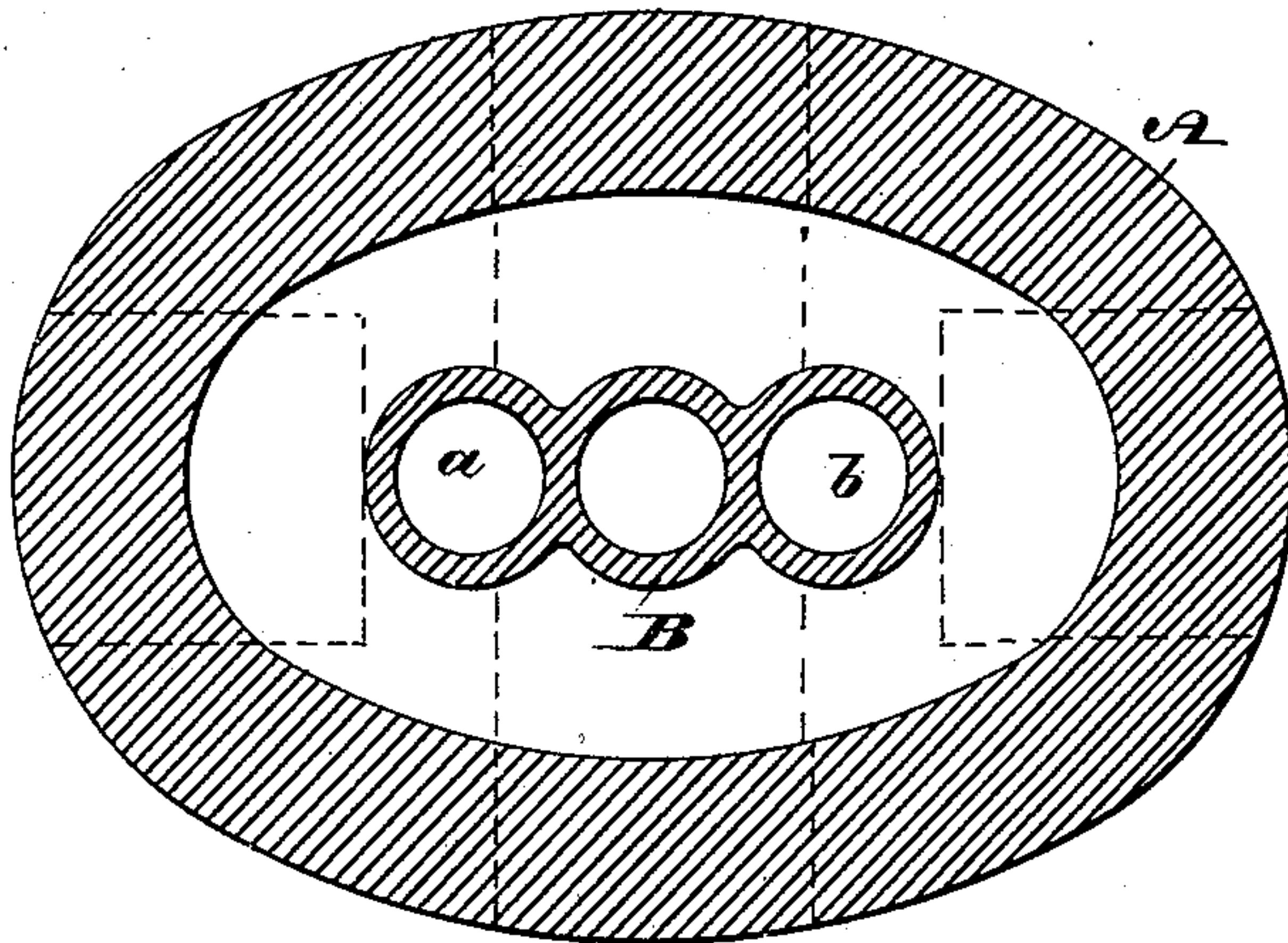


Fig. 5.

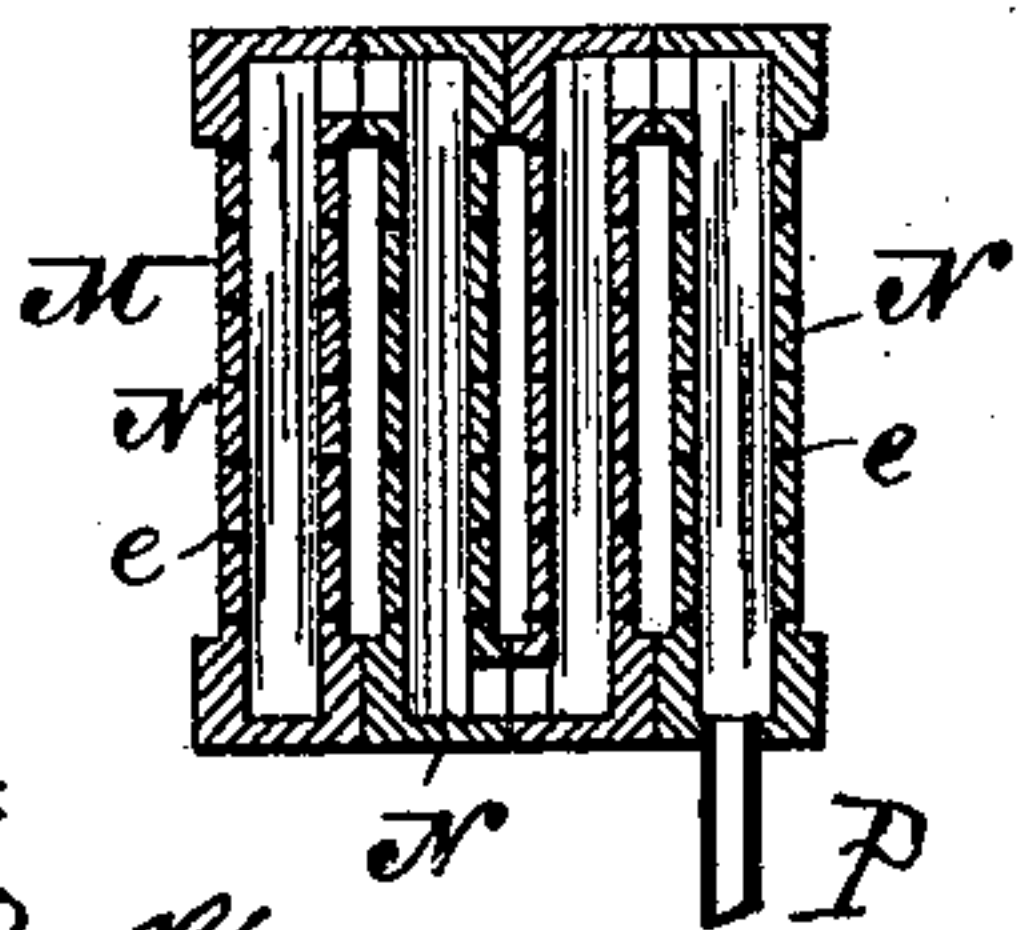
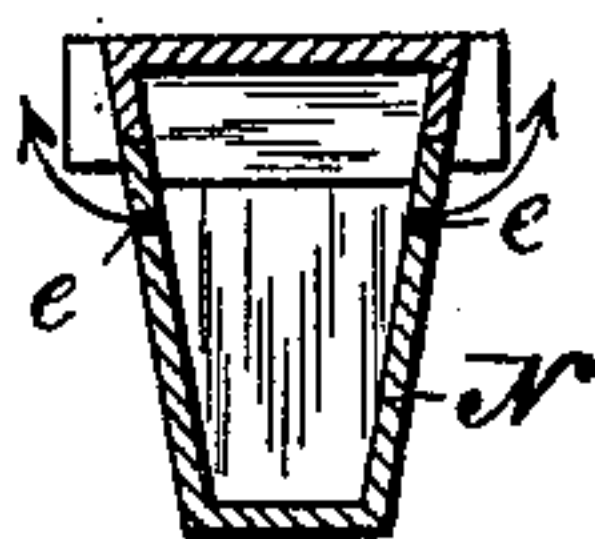


Fig. 6.



WITNESSES:

Theo. Rollé.
A. P. Jennings.

INVENTOR:

William G. Bedford.
BY Diederichsen and Quirner

ATTORNEYS.

UNITED STATES PATENT OFFICE.

WILLIAM G. BEDFORD, OF PHILADELPHIA, PENNSYLVANIA.

APPARATUS FOR GENERATING GAS.

SPECIFICATION forming part of Letters Patent No. 404,886, dated June 11, 1889.

Application filed April 17, 1888. Serial No. 270,992. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM G. BEDFORD, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Generating Gas, which improvement is fully set forth in the following specification and accompanying drawings.

My invention consists of an apparatus for generating gas for illuminating and heating purposes, the same embodying a novel retort, a novel feeding device for the material from which the gas is produced, and other features, as will be hereinafter set forth.

Figure 1 represents a vertical section of a gas-generator embodying my invention. Figs. 2 and 3 represent horizontal sections, respectively, on lines $x x$ and $y y$, Fig. 1, on an enlarged scale. Fig. 4 represents a horizontal section on line $z z$, Fig. 1. Fig. 5 represents a horizontal section of a portion of the grate of the apparatus on an enlarged scale. Fig. 6 represents a transverse vertical section of one of the bars thereof.

Similar letters of reference indicate corresponding parts in the several figures.

Referring to the drawings, A represents the furnace, within which is supported a retort B, consisting of a series of vertical parallel tubes, which communicate alternately at opposite ends, one of the tubes a constituting the inlet of the retort and the other tube b constituting the discharge thereof, said tube b being connected with the eduction-pipe c . Above the furnace is mounted a horizontally-arranged feeding-wheel C, the same having near its periphery a number of openings d , which by the rotation of the wheel may be placed in communication with the tube a of the retort. Located above the wheel C is a chute or hopper D and a steam-pipe E, which, as will be seen, are so disposed that said hopper and pipe each communicates with one of the openings d of the wheel. Projecting into the pipe E is a pipe F, for directing hydrocarbon vapor into said pipe.

The wheel C is secured to a vertical shaft G, which has suitable bearings on the furnace A and carries a pulley H, whereby power may be communicated to said wheel, thus bring-

ing the openings d successively under the hopper D and steam-pipe E.

The operation is as follows: The retort B is highly heated by the fire in the furnace A, the products of combustion escaping from the latter through the exit-pipe J. Pulverized coal, sawdust, or other comminuted carbonaceous material is supplied to the hopper D, and steam and hydrocarbon vapor are directed into the pipe E. The wheel rotates, and as an opening d comes under the hopper D it is charged with material from the hopper, it being noticed that the wheel rotates within a housing or casing K, the bottom or bed whereof closes the lower end of the opening d , said bottom, however, being cut away above the tube a . The charge of carbonaceous material is carried around by the wheel until it reaches the tube a , when the opening which contains the charge is also in communication with the pipe E. The steam, hydrocarbon vapor, and carbonaceous materials are now injected into the tube a , and such action is repeated at intervals, due to the rotation of the wheel C. The injected materials now traverse the retort, passing alternately through the tubes thereof, and are subjected to the greatest heat thereof, especially around the grate of the furnace, the result being the rapid and effective conversion of the materials into a gas of superior power suitable for illumination or heat. The gas as produced is directed from the retort through the pipe c .

I may admit either live, superheated, or exhaust steam or hydrogen into the retort through the wheel C, and may admit an additional supply of the same into the retort below the wheel by means of a suitable pipe. (Shown in dotted lines, Fig. 1.)

Within the pipe E is a vertically-movable sleeve L, which is flanged at top and bottom and forced by the steam against the wheel C, so as to produce a tight joint thereat, without, however, preventing the rotation of said wheel. The sleeve yields due to any inequalities on the surface of the wheel.

In order to utilize the generated gas for the furnace which contributes to generate said gas or other gas, the grate M is formed of hollow vertical bars N, which are placed side by

side, and communicate by means of openings in the walls of the bars alternately at the inner and outer ends of the bars, forming a zig-zag passage throughout the grate. (See Fig. 5.)

A pipe P for the admission of gas with or without steam and hydrocarbon vapor into the grate is connected with one of the bars, and openings or jets *e* are formed in the sides of the bars to permit the escape of gas from the grate, the same forming a gaseous fuel for the furnace, to be used with or without solid fuel.

The furnace is provided with a proper door, ash-pit, &c. The base of the retort is accessible through suitable man-holes for cleansing and other purposes.

Should hydrocarbon fluid be directed into the pipe F, it will be vaporized by the steam in pipe E; but it is preferable to admit hydrocarbon vapor directly into said pipe F, avoiding carbonization in the pipe E and wheel C.

It will be observed that by the peculiar arrangement of the openings of the feeding-wheel and the hopper and vapor-pipe with relation to said openings the charge is delivered into an opening of the wheel, by which it is carried around under the vapor-pipe and drops into the retort, the charge and vapor being thoroughly commingled and the operation of the generator rendered more effective.

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

1. In a gas-generator, a retort, a horizontal rotary feeding-wheel provided with openings, a hopper or chute communicating with the openings, and a vapor-pipe also communicating with the openings of the feeding-wheel at a different place from the hopper, whereby the hopper supplies the charge to an opening of the feeding-wheel, which carries the same around under the vapor-pipe and deposits it into the retort, thereby thoroughly commingling the charge with the vapor, substantially in the manner and for the purpose described.

2. In a gas-generator, a retort, in combination with a steam-pipe, an intermediate rotary supply-wheel with opening communicating between said pipe and retort, and a vertically-removable flanged sleeve in said pipe, substantially as and for the purpose set forth.

3. In a gas-generator, a furnace having a retort with tube located therein, a horizontal

rotary feeding-wheel with openings mounted on a vertical shaft above said furnace, a hopper with an opening adapted to communicate with the openings of the feeding-wheel, a casting having its bottom adapted to close the lower end of said openings and cut away above the tube of the retort, a steam-pipe communicating with the tube of the retort by means of the openings in the feeding-wheel, and a hydrocarbon-vapor pipe leading into the steam-pipe, said parts being combined substantially as described.

4. In a gas-generator, a furnace with the retort having a tube, a horizontal feeding-wheel mounted above the furnace and having openings near its periphery adapted to communicate with the tube of the retort, the casting having its bottom adapted to close the lower end of the openings in the feeding-wheel, a steam-pipe communicating with the tube in the retort by means of the openings of the feeding-wheel, and a hydrocarbon-vapor pipe leading into the steam-pipe, said parts being combined substantially as described.

5. In a gas-generator, a furnace with a retort consisting of a series of vertical parallel tubes communicating alternately at opposite ends and having an inlet and outlet with an eduction-pipe, a housing or casing secured to the top of said furnace, a horizontal rotary wheel having openings within said casing, the said openings adapted to coincide with an opening leading to the retort, a steam-pipe leading into the retort through one of said openings, and a hydrocarbon-vapor pipe leading into the said steam-pipe above said wheel, said parts being combined substantially as described.

6. In a gas-generator, a furnace with a retort thereto, a casing above said furnace having the bottom cut away at an upper opening of the retort, a rotary wheel within said casing having openings coinciding with the upper opening of the retort, a steam-pipe leading into the retort through one of said openings in the rotary wheel, a hydrocarbon-pipe leading into the steam-pipe, and an expansible collar in said steam-pipe above the rotary wheel, said parts being combined substantially as and for the purpose set forth.

WILLIAM G. BEDFORD.

Witnesses:

JOHN A. WIEDERSHEIM,
A. P. JENNINGS.