

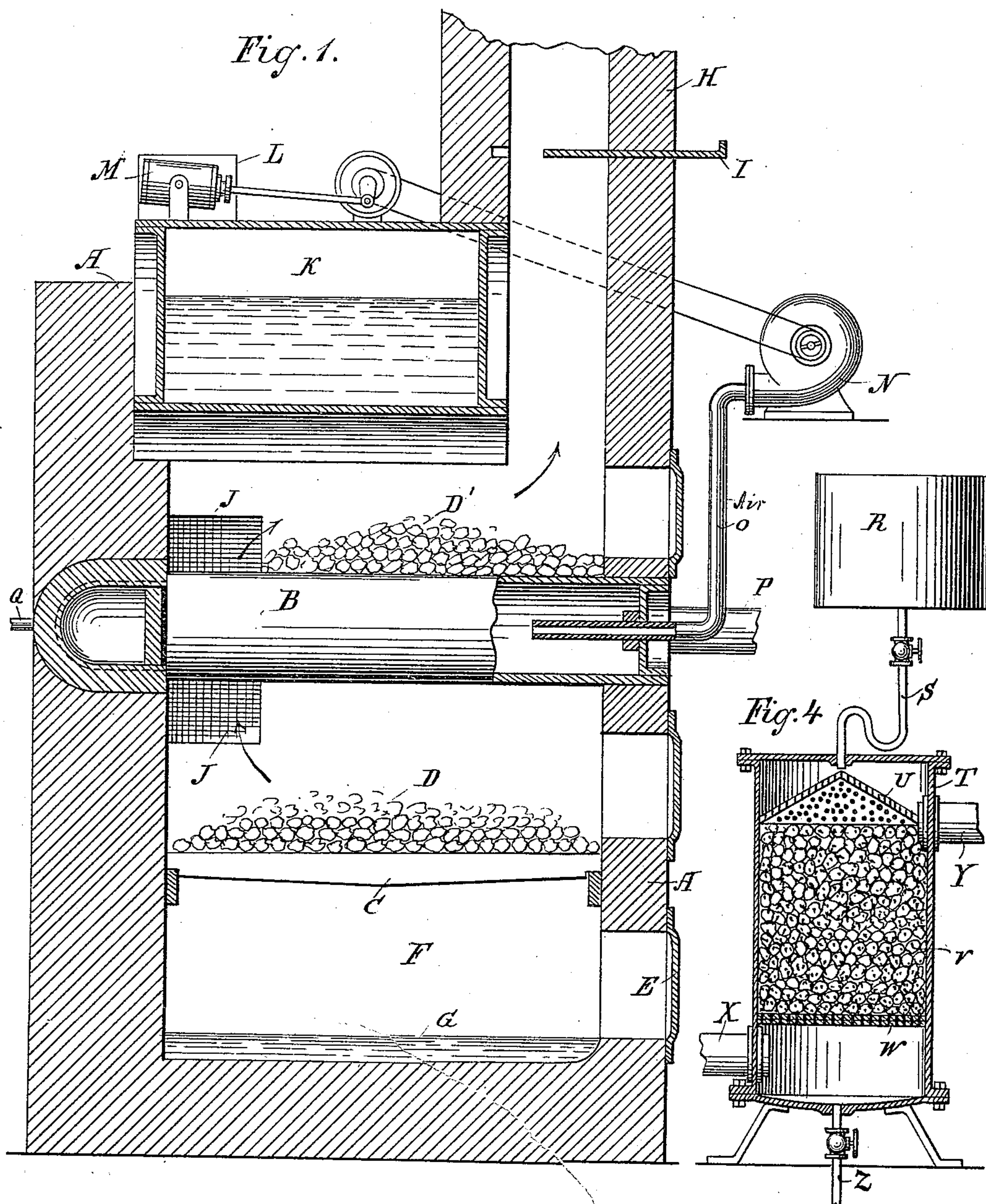
(No Model.)

3 Sheets—Sheet 1.

E. DE BEAUHARNAIS.
ART OF MANUFACTURING ILLUMINATING GAS.

No. 440,754.

Patented Nov. 18, 1890.



Witnesses:
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H. M. Valentine

Inventor.
Eugene de Beauharnais
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(No Model.)

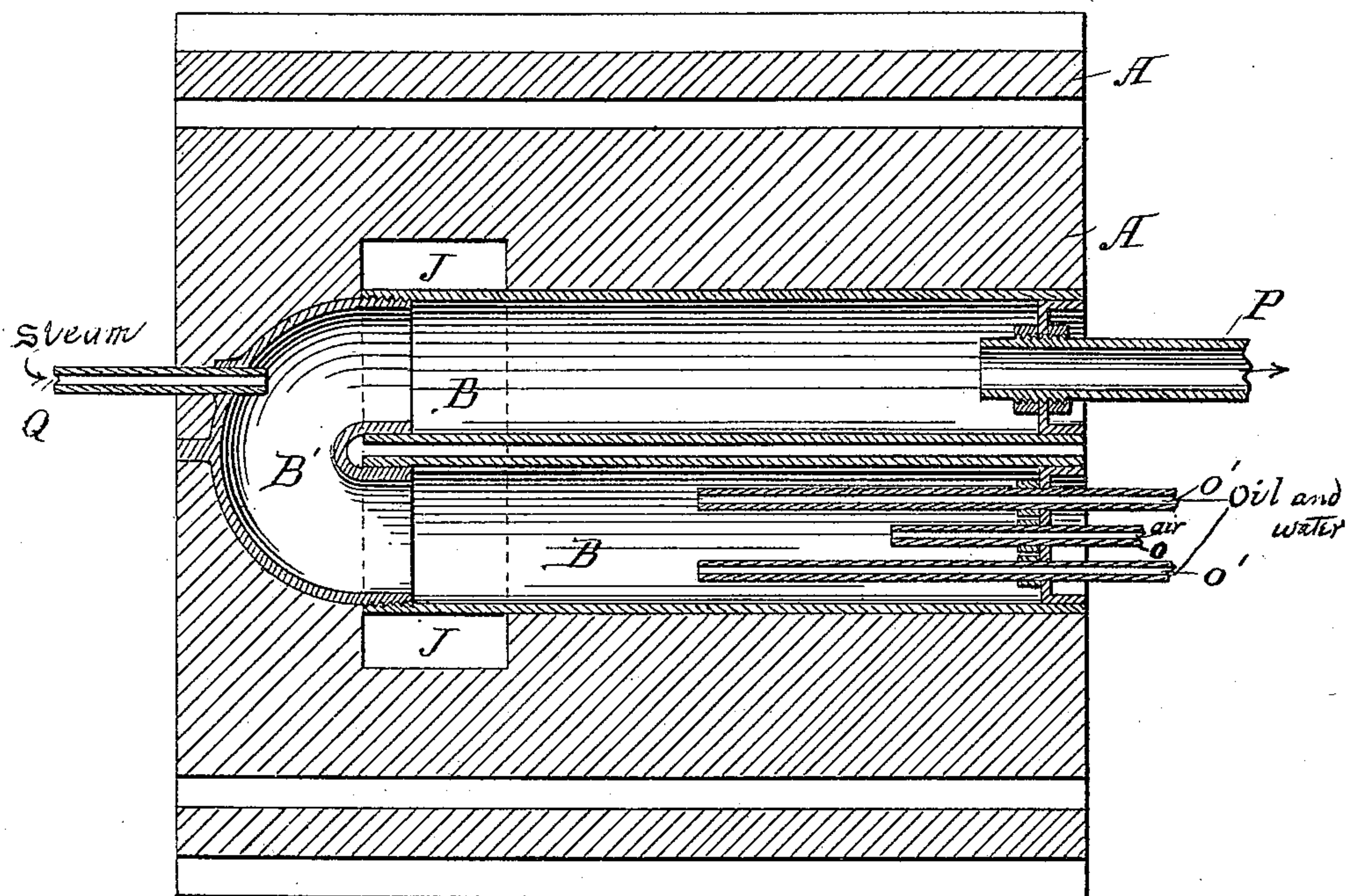
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Fig. 2.



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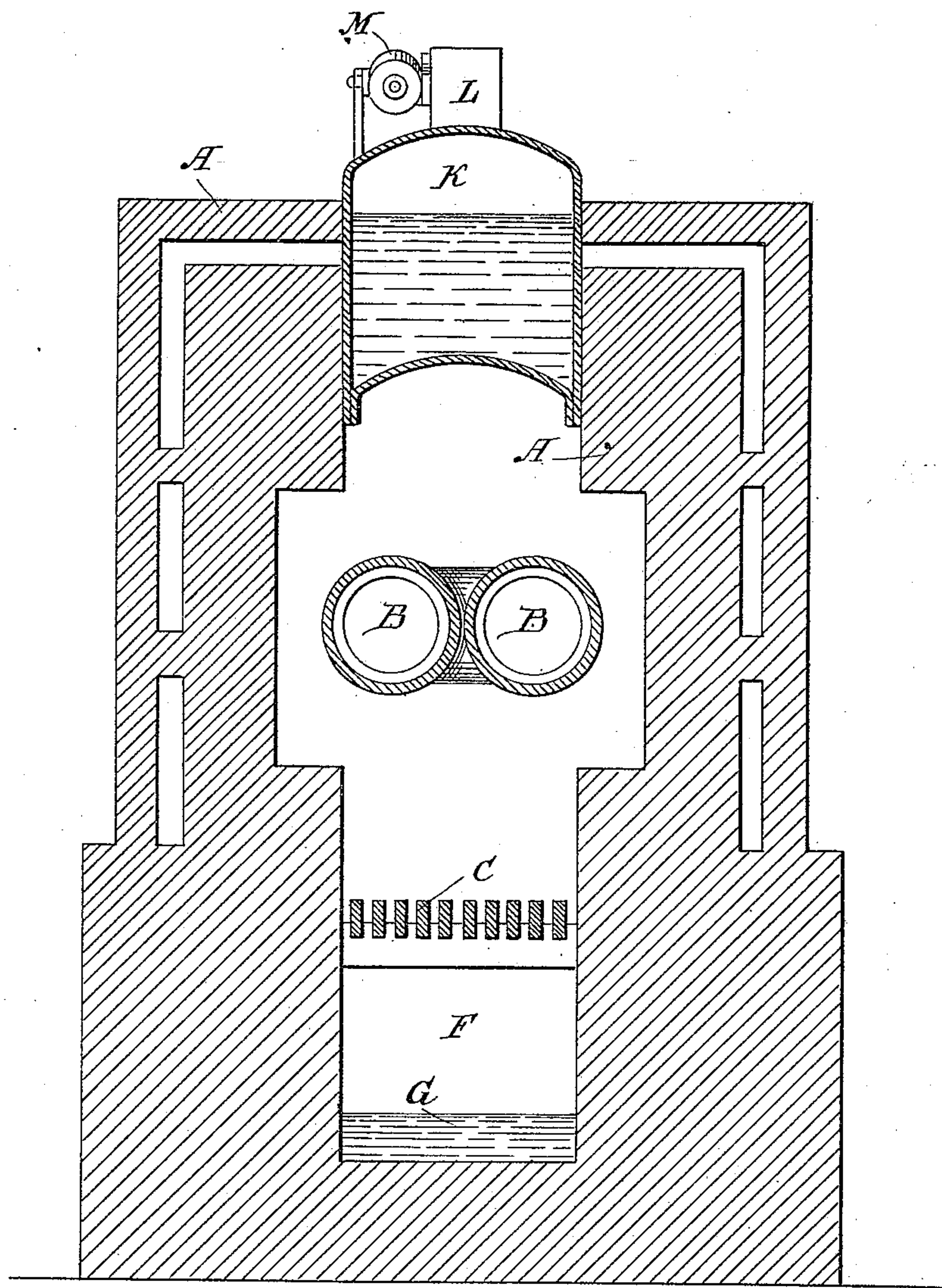
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Fig. 3



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UNITED STATES PATENT OFFICE.

EUGENE DE BEAUHARNAIS, OF NEW BEDFORD, MASSACHUSETTS.

ART OF MANUFACTURING ILLUMINATING-GAS.

SPECIFICATION forming part of Letters Patent No. 440,754, dated November 18, 1890.

Application filed September 27, 1890. Serial No. 366,337. (No model.)

To all whom it may concern:

Be it known that I, EUGENE DE BEAUHARNAIS, a citizen of the United States, residing in New Bedford, in the Commonwealth of Massachusetts, have invented certain new and useful Improvements in the Art of Manufacturing Illuminating-Gas, of which the following is a description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a vertical longitudinal section through a retort and its attendant parts, a portion of the retort being shown in elevation. Fig. 2 is a horizontal section through said retort. Fig. 3 is a vertical section through the retort and its attendant parts. Fig. 4 is a vertical section of a device through which the gas is passed after leaving the retort and before it reaches the burner and by means of which the gas is purified and enriched.

Similar letters of reference indicate corresponding parts in all the figures of the drawings.

The following is a description of the structure illustrated by the drawings.

Referring now more especially to Fig. 1, A A is the brick-work inclosing the furnace and forming the walls thereof.

B is a retort, into which the constituents of the gas are introduced and mingled. It is a duplex retort, substantially of the form in its cross-section of a contracted letter U.

C are the grate-bars of the furnace, and D the fuel-bed placed on the grate-bars under the retort.

D' is an additional fuel-bed placed on the top of the retort.

E E E are furnace-doors.

F is an ash-pit, and G water contained therein.

H is a chimney or flue, and I a damper by means of which the draft is regulated.

J J is a flue for the passage of the heated air and products of combustion from the lower to the upper part of the furnace, as shown by the arrows.

K is a boiler containing water from which steam is generated.

L is a steam-chest, and M a piston worked by the steam so generated and from which power is communicated to a blower N of suitable construction, and is connected to the air-

inlet tube O within the retort, this tube being heated by any suitable means to heat the air passing through it, as by extending into the retort a short distance.

P is a duct through which the gas generated in the retort is led to the reservoir or gas-holder.

Q is a steam-inlet pipe by means of which the steam is introduced into the retort.

Fig. 2, which is a horizontal section taken through the retort B, shows its construction more clearly. The retort is composed of two tubes arranged side by side and communicating at their ends by the curved coupling or connecting pipe B'. It is readily constructed, as shown in the drawings, by screwing the ends of the tubes into the ends of the curved connecting-pipe B', as shown. At the front end of one limb of this duplex retort inlet-tubes O O' O' enter. Air is introduced by means of the tube O from the blower N, and mingled petroleum and water are introduced through the tubes O' O'.

Q is an inlet-pipe for steam.

The constituents of the gas are petroleum, oil, water, air, and steam highly heated, and they form a gas of great commercial value. The gas so formed is let out through the duct P to the gas holder or reservoir. Fig. 2 shows the walls of the furnace separated by an air-chamber, whereby a current of heated air is made to surround the furnace, keeping the heat regular and warding off cold drafts.

Fig. 4 is an adjunct of the apparatus. This adjunct consists of a tank R, containing hydrocarbon oil, preferably the highest grade of refined petroleum-oil.

S is a tube provided with a suitable stop-cock conveying the oil to the upper end of the box T.

U is an inverted perforated cone, on the apex of which the oil from the reservoir drops, spreading out over the surface and passing through the perforations.

V are sponges, which are partially or wholly saturated with refined petroleum-oil. These sponges are supported upon a grating W.

X is a gas-inlet pipe communicating with the gas-holder, and Y is a duct leading to the gas-main or to the point of consumption.

Z is a tube leading from the bottom of the sponge-box, provided with a valve, by means

of which the lower part of the box may be drained and cleaned.

The foregoing is a description of the apparatus I prefer to use in the manufacture of my improved gas. The same result may, nevertheless, be accomplished with other forms of apparatus; but after many tests and much experience I find this structure to be best adapted for my purpose.

The elements of which I make my gas consist of a combination of crude petroleum, oil, water, steam, and air treated and brought together as follows:

In the practice of my invention I first take a quantity of crude petroleum and treat it with a vegetable compound consisting of ground corn-cobs mixed with a small quantity of ashes made from the wood and bark of the white-ash tree. Thus, for example, take one bushel of ground corn-cobs and place it in a hollow perforated copper cylinder or receptacle made of wire or of thin copper sheets finely perforated. This retaining-cylinder is set in a second cylinder or receptacle made of wood. To each bushel of prepared cobs I add not more than one pint of the ashes, spreading it on the top of the cobs. A concave perforated cover is placed on the top of the retaining-cylinder, and into said cover the crude petroleum is thrown and allowed to drip down through the perforations onto the compound below. The retaining-cylinder should be fastened to the tub in which it sets by brackets or other suitable fastenings to prevent it from floating when petroleum-oil has accumulated in the tub, as the cobs are much lighter than the oil in which they are immersed. The retaining-cylinder and containing-tub may be of any suitable size and shape adapted for the purpose. About one bushel of cobs is sufficient to treat one barrel of petroleum. To get good results the oil should be left in contact with the compound about twenty-four hours. Just what the chemical effect of this treatment is I have not been able to determine, but I do know that the result of the treatment is a very superior illuminating-gas. The crude petroleum having been treated as aforesaid and mixed with rain-water, the operation of making the gas is as follows: After the fire has been laid and the retort brought up to the required temperature—say 1,500° Fahrenheit—heated air is admitted through the tube O, and the prepared petroleum and rain-water are admitted through tubes O' O', and the steam generated outside of the retort is admitted through the tube Q. These ingredients are converted into gas in the retort, whence it is lead into the reservoir. In one limb of the retort is a return-tube, and the gas is therein superheated before it escapes to the reservoir. The water and petroleum are converted into steam and hydrocarbon vapor in the one limb of the retort and there combined, and the steam generated outside of

the retort is introduced into the opposite end of the other limb and projected toward the outlet, so that while at the same time the gas is generated, mingled, and combined, it is accelerated in its passage from the retort by the current. In this connection I desire to state that by repeated tests I have ascertained that by introducing water and steam into the retort along with the petroleum, as above described, instead of introducing steam alone, a large quantity of fixed gas of superior quality is produced. In this operation a part of the waste heat is utilized in converting water into steam, and part of this steam is forced into the retort through the tube Q and part employed to work the piston supplying power to the blower, which is employed in forcing heated air through the tube O, and for increasing the draft of the furnace, if that be desired, in any ordinary way. After the gas has been thus generated and collected into the reservoir it is passed through the tank R, containing the refined petroleum, and sponges, by which it is greatly enriched, and all foreign particles are removed from it before it passes to the burners and by which the clogging and choking of the burners is avoided. When the gas is to be employed for any ordinary illuminating or heating purposes, it is not desirable to highly charge it with hydrocarbon, as above described, and in that case the sponge-box above described is employed merely to free the gas of foreign particles floating in it, the sponges in that case not being saturated with oil, in which case the clogging or choking of the burners is prevented and a gas is produced which will not emit sparks in burning.

In the manufacture of illuminating-gas from the ingredients and in the manner above described an illuminating-gas is produced that for all practical purposes in the use of such gas I have found to be non-explosive, non-asphyxiating, sanitary, not even injuriously affecting the life of delicate house-plants.

The novelty of my invention is embraced by the following claims.

1. The process of manufacturing illuminating-gas, which consists in treating crude petroleum by passing it through wood-ashes and ground corn-cobs, and highly heating the oil so treated, together with water, steam, and air, in a retort, as set forth.

2. The process of manufacturing illuminating-gas, which consists in treating petroleum by passing it through wood-ashes and ground corn-cobs, highly heating the oil so treated, together with water, steam, and air, in a retort, and passing the resulting gases through a filtrant saturated with refined petroleum, substantially as set forth.

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