No. 665,730.

Patented Jan. 8, 1901.

E. J. DUFF.

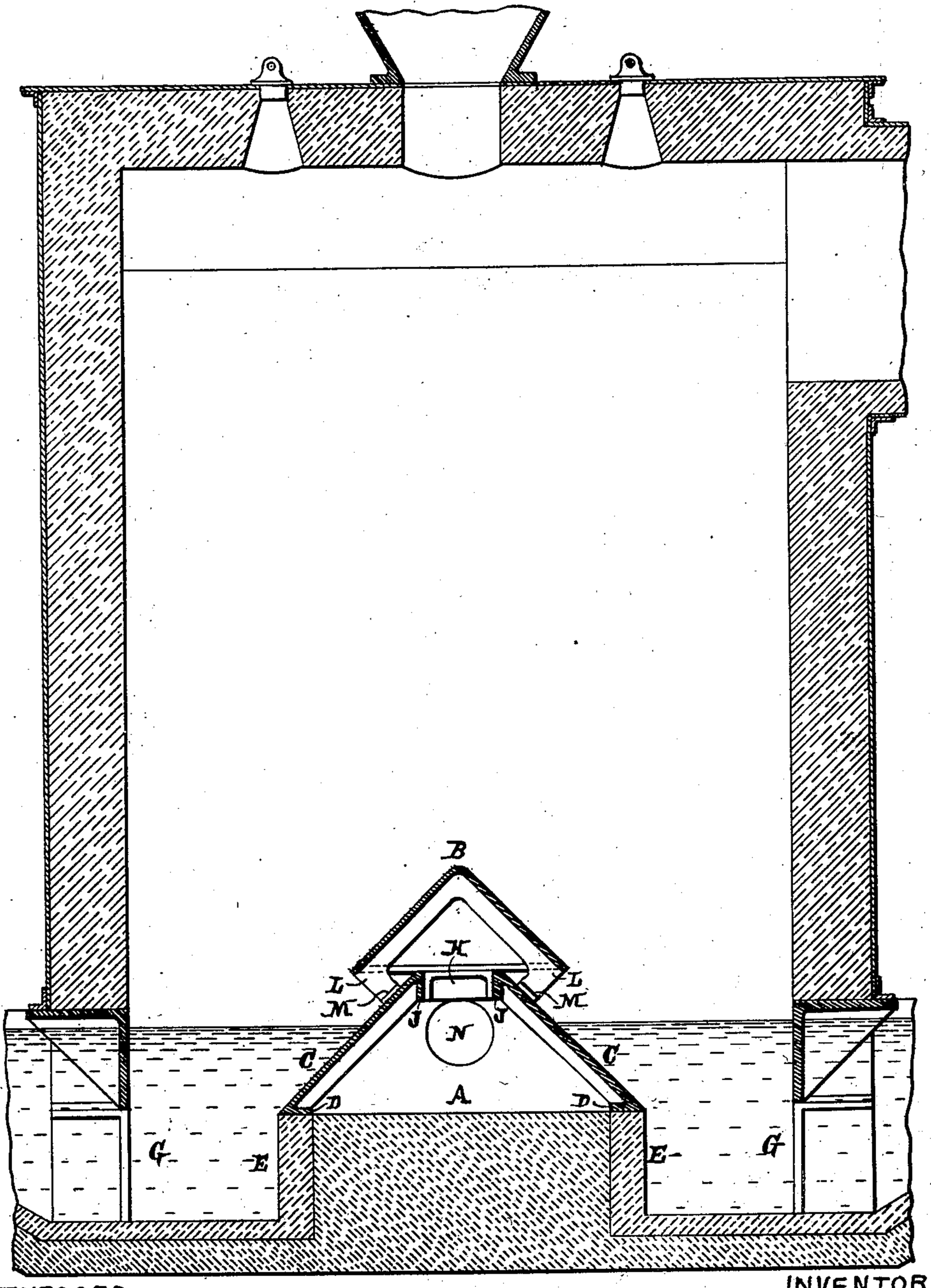
GAS PRODUCER.

(Application filed June 7, 1900.)

(No Model.)

3 Sheets—Sheet 1.

FIG. 1.



WITNESSES

Walter Abbe

L. C. Connor

INVENTOR

Edward James Duff

BY

Howson and Howson

ATTORNEYS

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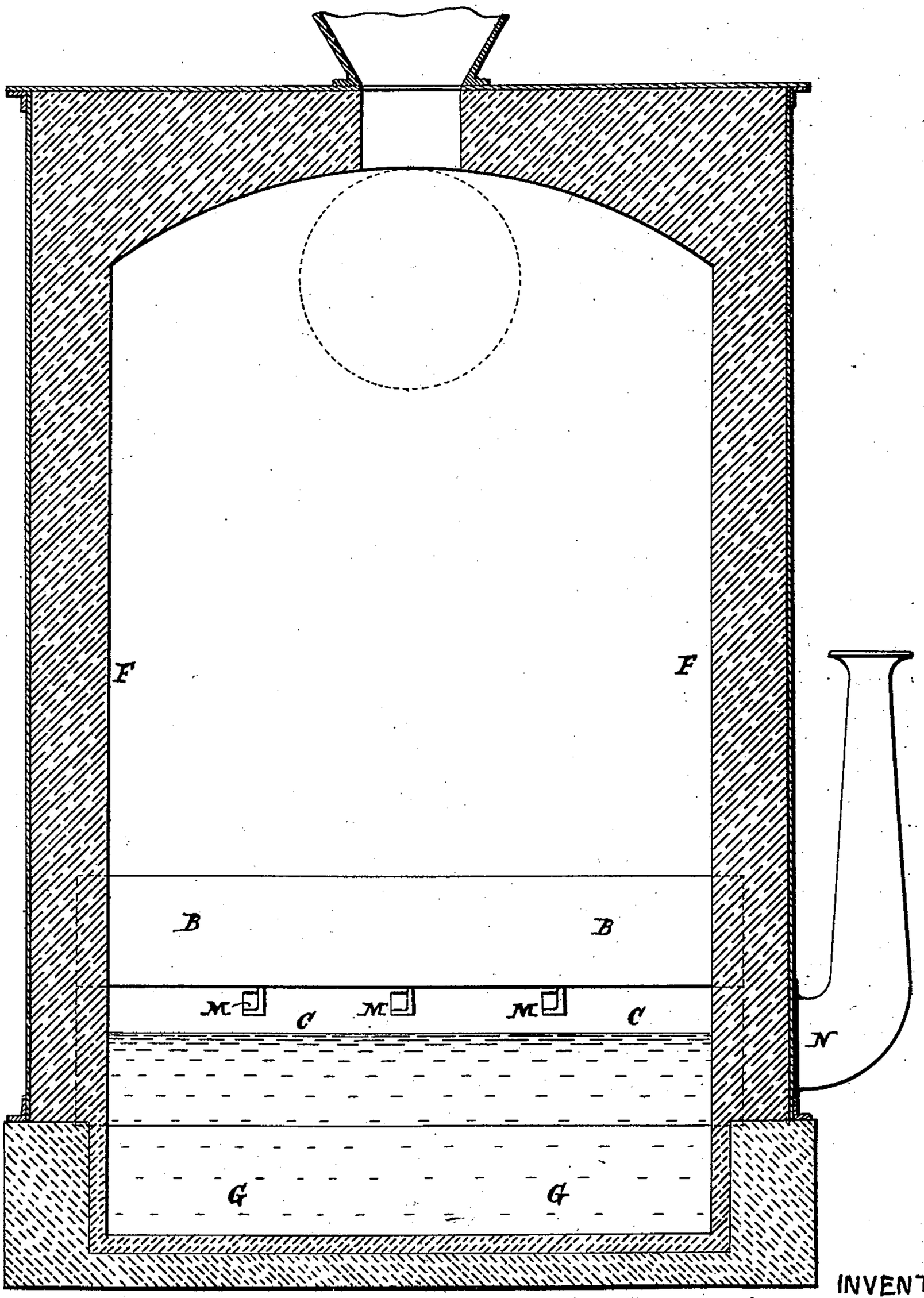
(No Model.) 3 Sheets—Sheet 2.

FIG. 2.



WITNESSES
Waller Abbe
S. C. Connor

INVENTOR
Edward James Duff
BY Howson and Howson
ATTORNEYS

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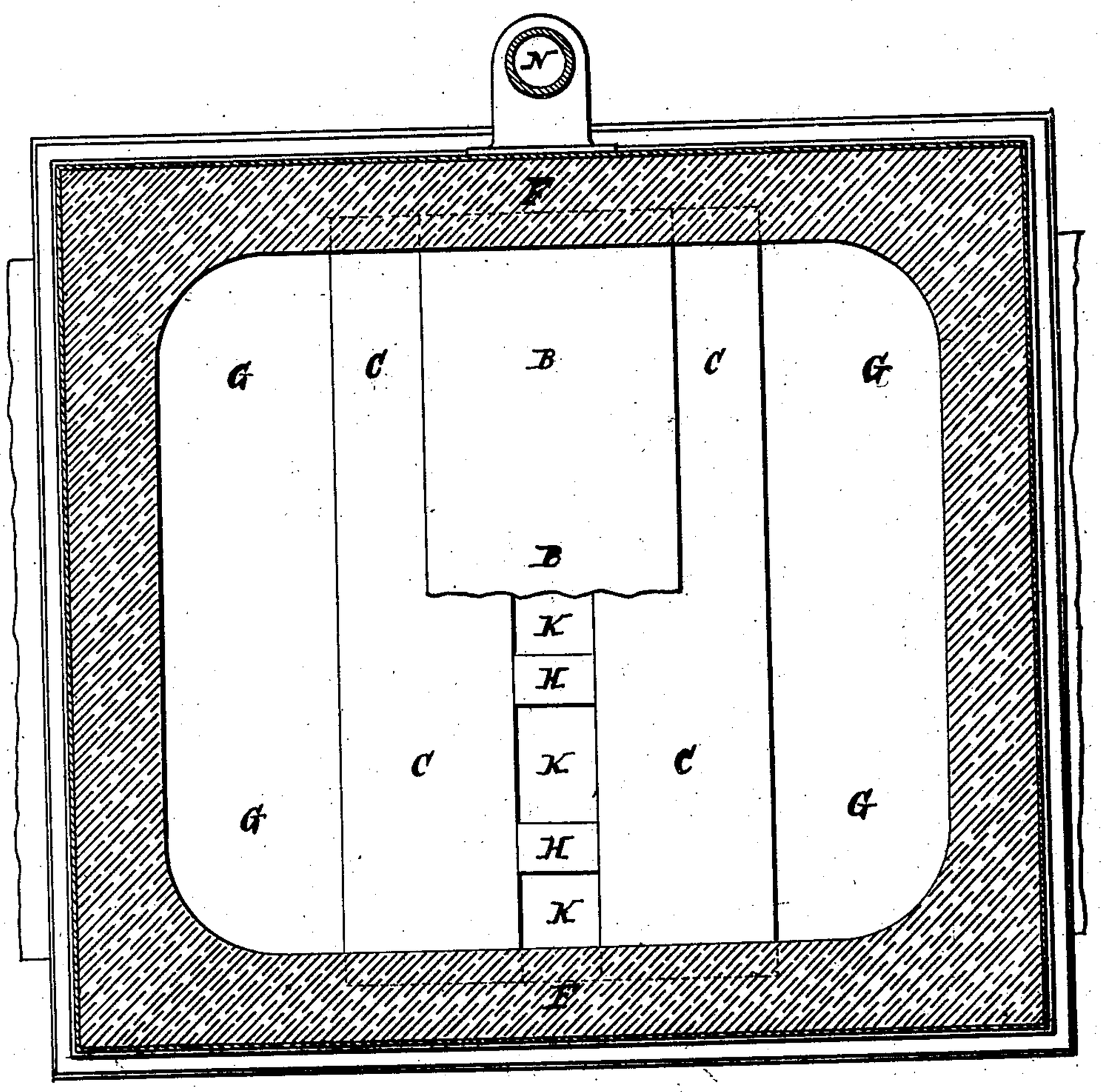
3 Sheets—Sheet 3.

FIG. 3.



WITNESSES

Walter Abbe

S. C. Connor

INVENTOR

Edward James Duff

BY

Howson and Howson

ATTORNEYS

UNITED STATES PATENT OFFICE.

EDWARD JAMES DUFF, OF LIVERPOOL, ENGLAND.

GAS-PRODUCER.

SPECIFICATION forming part of Letters Patent No. 665,730, dated January 8, 1901.

Application filed June 7, 1900. Serial No. 19,398. (No model.)

To all whom it may concern.

Be it known that I, EDWARD JAMES DUFF, a subject of the Queen of Great Britain and Ireland, and a resident of Liverpool, in the county of Lancaster, England, (whose postal address is Holly Lodge, Cressington Park, Liverpool, England,) have invented certain Improvements in Gas-Producers, of which the following is a specification, and for which I have applied for British Patent No. 3,631, dated February 24, 1900.

My said invention relates to gas-producers of the kind described in my Patent Specification No. 517,271 of 1894; and it has for its object to provide improvements in the grate or casing on which the fuel is received to be acted on by the steam-laden air, so as thereby by such improvements to effect an increase in the efficiency of the gas-producer and reduce the cost of working.

In the accompanying explanatory drawings, Figures 1 and 2 are vertical sections as at right angles to each other, and Fig. 3 is a horizontal section of a gas-producer provided with the improvements.

According to the invention the improved grate part is composed of lower and upper portions A B, which are located in the lower part of the producer. The lower portion or blower-casing A consists of sloping or inclined plates C, which are fixed by their flanged parts D to a seating E, of brickwork, the ends of the casing being fixed or built into the main side walls F of the producer. The plates C are inclined upward from the sides toward each other and so as to leave a space between them at their top ends, which extend a comparatively short distance above the water in the ash-trough G. Distance-pieces H are provided for connecting the top ends of the plates, the pieces fitting between connecting-flanges J, formed on the plates. The connecting-pieces H are fixed at intervals in the intervening top space, so as to leave sufficiently large openings K for the passage of air to the fuel-bed. The upper portion or cover B extends along the top of the lower casing A and is a casting in the form of an inverted V in cross-section, having its sides sloping similarly to those of the lower casing. The cover B is fixed over the lower casing A, so as to form wide sloping side passages or outlets L for air extending completely across the producer, the lower edges of the cover extending down to within a comparatively short distance from the normal level of the water in the ash-trough G. The cover is formed with brackets M, by means of which it is fixed to the lower casing A, or instead of or in addition to this method of attachment the cover may have its ends fixed or built into the main side walls F of the producer.

The air for combustion or gasification is injected into the lower casing A through an inlet N by means of a steam-jet, or the steam and air together may be driven into the casing by a fan or blower, and with the improved arrangement of blower-casing and cover, as hereinbefore described, the steam-laden air is blown through the top openings K in the casing A and down through the sloping side passages L between the cover B and the casing, issuing from below the lower edges of the cover to mingle with the fuel, so that the air is thereby blown into the fuel-bed at the lowest point or immediately above the water in the ash-trough G. The ashes or residues fall upon the sloping side or delivery plates C, which extend toward the sides of the producer and below the water-level in the ash-trough G, the ashes being thereby directed toward openings, through which they may be removed by means of shovels or rakes.

The other parts of the gas-producer are constructed and arranged substantially in the same manner as described in my earlier specification hereinbefore referred to.

Important advantages are obtained from the use of the hereinbefore-described improvements. A grate-casing or fuel-receiving part made with perforations or gratings as described in my earlier specification is found to be unsuitable where the gas is being generated with a view to the recovery of ammonia from the resultant gas. In such cases a large quantity of steam is used along with the entering air, and the excess of steam moistens the fuel-dust falling through the perforations, causing the dust to adhere to the gratings and resulting eventually in the choking and rusting up of these air-passages. By the use, however, of the improved blower-casing and cover, as hereinbefore described, no choking of the parts can take place, as the

air-passages and parts are so constructed and arranged that there is no tendency for the fuel-dust to adhere to the sides and block up the air-openings. A great advantage is also gained in ammonia-gas producers by blowing the air into the fuel-bed at the lowest point, as described in the improvements. By this means a greater height of fuel is presented for the steam-laden air to pass through in its upward course through the fuel-bed, and thus the steam is better broken up, and the amount of carbonic acid formed in the resultant gas is thereby reduced, the higher blast-pressure used in ammonia-gas producers enabling the air to be sufficiently distributed throughout the fuel-bed.

What I claim as my invention is—

1. A gas-producer provided with a water-sealed ash-trough, a blower-casing and a cover therefor having inclined sides extending completely across the lower part of the producer, the top of the casing and the bottom of the cover being placed near the normal level of water in the ash-trough to give air-outlets there extending across the producer, substantially as and for the purposes herein set forth.

2. A gas-producer provided with a water-sealed ash-trough and a blower-casing located in the lower part of the producer and extending across the producer, said casing having inclined sides and being formed with openings along the top, and being fixed to a brick-work seating and provided with an inlet for the admission of steam and air for combustion or gasification, in combination with a cover to form with the casing downwardly-sloping air-passages extending across the producer, all substantially as and for the purposes herein set forth.

3. A gas-producer provided with a water-sealed ash-trough a blower-casing and a cover therefor, the blower-casing and cover both having inclined sides extending across the lower part of the producer, the top of the casing and the bottom of the cover, between which are the air-outlets, being placed near the normal level of the water in the ash-trough, substantially as and for the purpose described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EDWARD JAMES DUFF.

Witnesses:

H. S. MATHEWSON,

H. WATSON.