

No. 674,887.

Patented May 28, 1901.

J. O. E. TROTZ.
GAS PRODUCER.

(No Model.)

(Application filed Nov. 8, 1900.)

2 Sheets—Sheet 1.

FIG. 3.

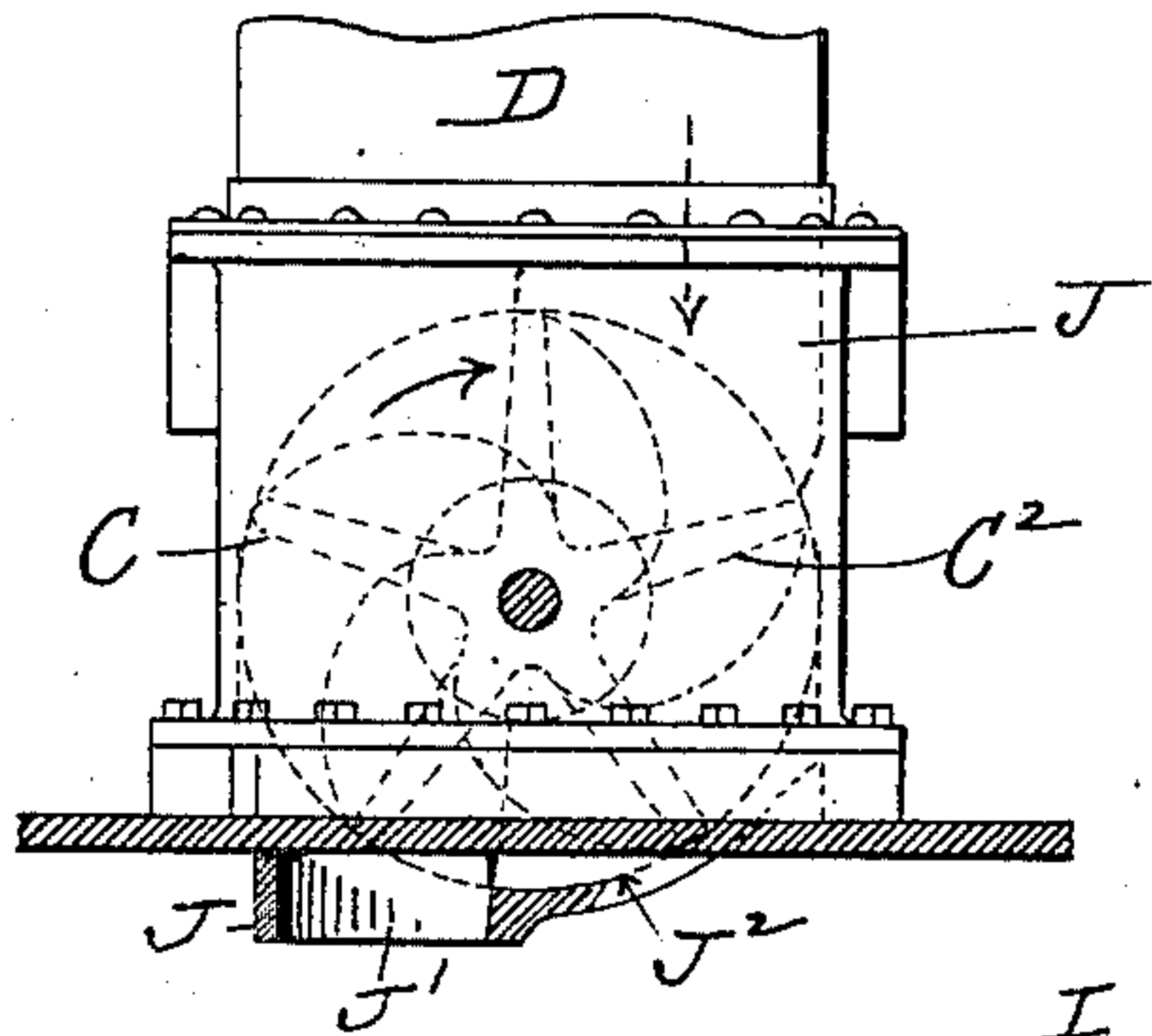
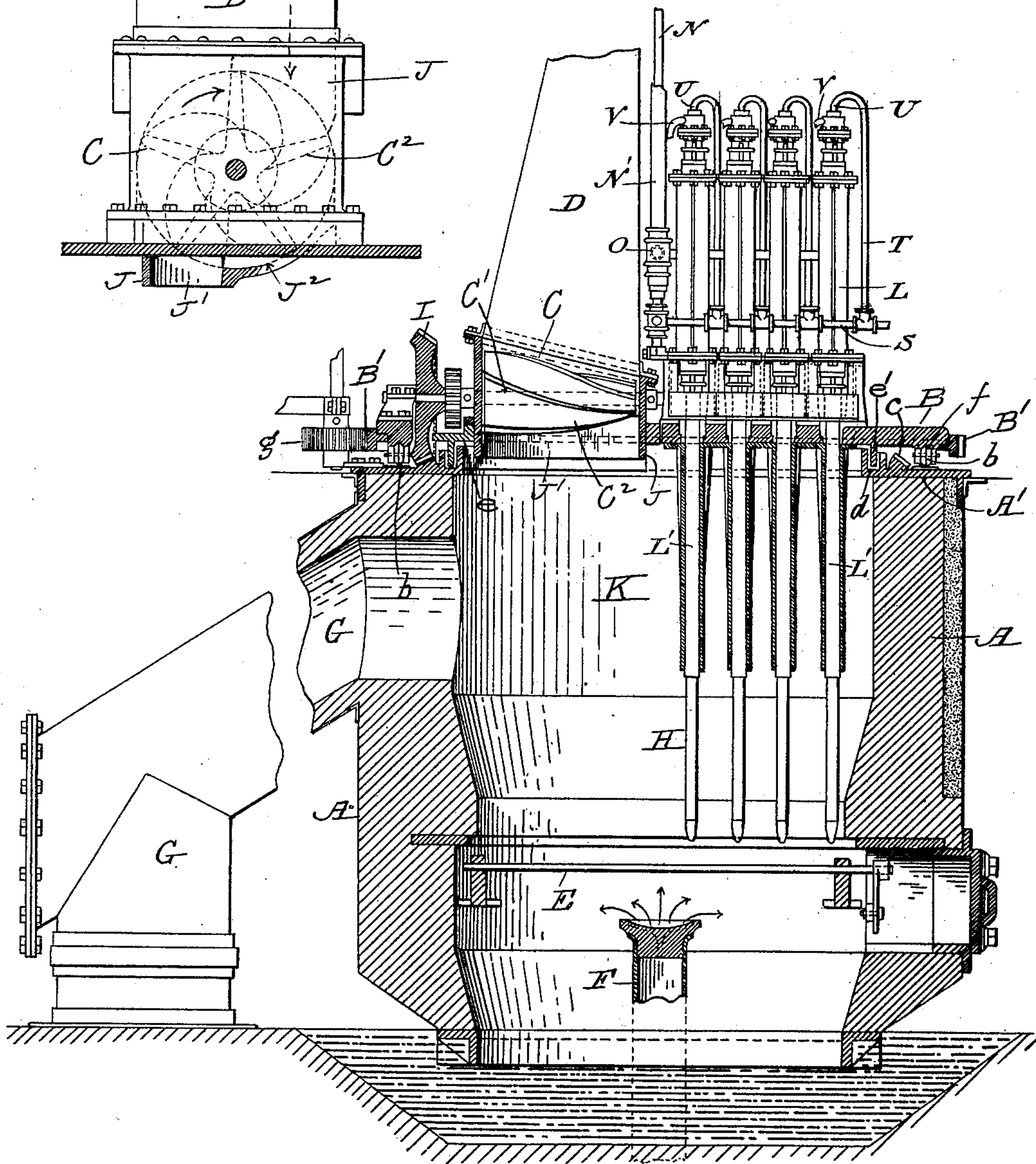


FIG. 1.



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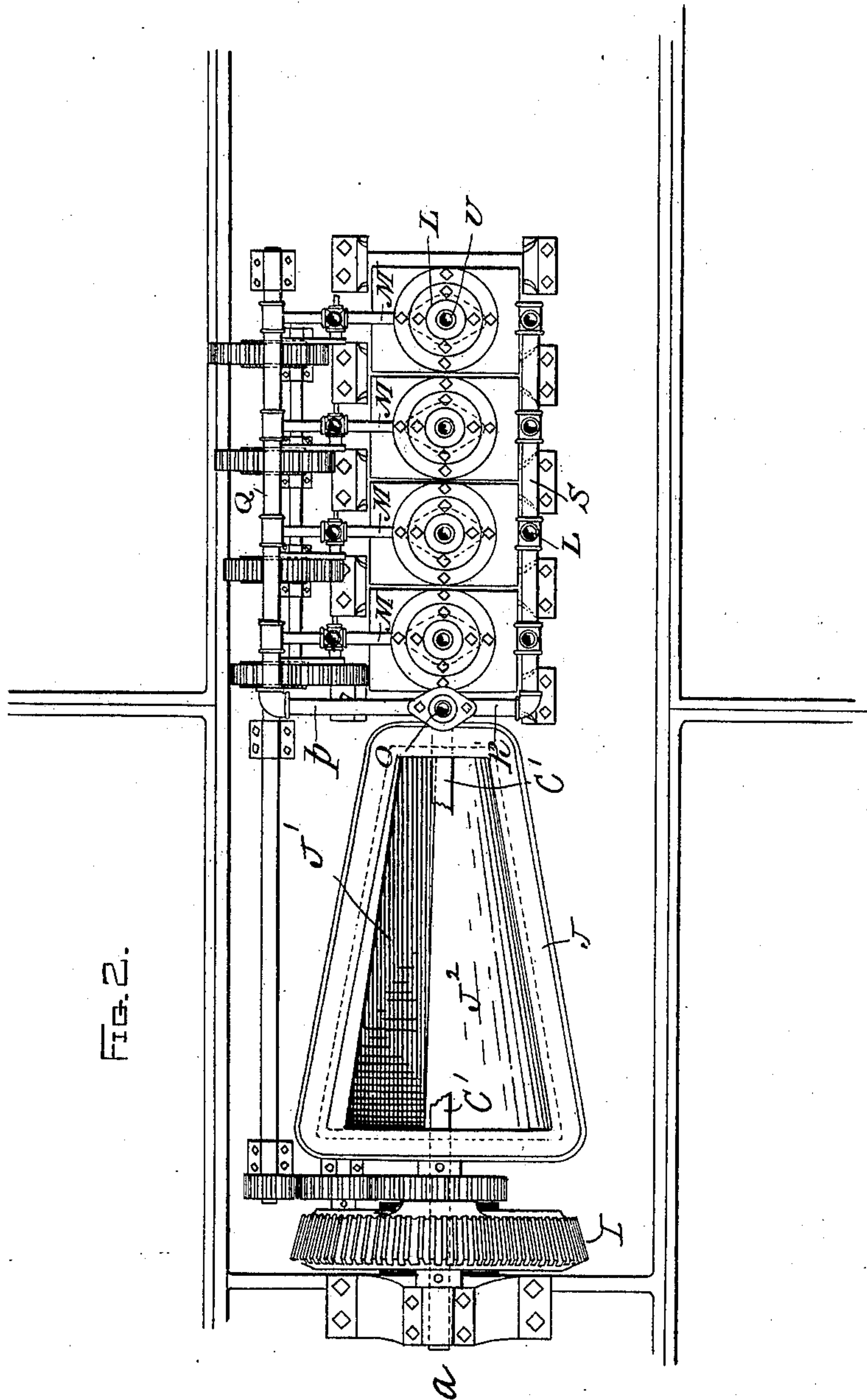


FIG. 2.

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UNITED STATES PATENT OFFICE.

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GAS-PRODUCER.

SPECIFICATION forming part of Letters Patent No. 674,887, dated May 28, 1901.

Application filed November 8, 1900. Serial No. 35,780. (No model.)

To all whom it may concern:

Be it known that I, JOHAN OTTO EMANUEL TROTZ, of the city and county of Worcester, in the State of Massachusetts, have invented certain new and useful Improvements in Gas-
Producers; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 represents a central vertical section, partly in elevation, of a gas-producer embodying my improvements, said section being taken at the point indicated by line *a* in Fig. 2. Fig. 2 represents, upon an enlarged scale, a plan of the parts of the producer to which said invention relates, with the coal-distributor left off to more clearly show the construction of the receptacle in which it is arranged; and Fig. 3 represents, upon the same enlarged scale as Fig. 2, a vertical section in front of the inner end of the coal-distributor, showing in dotted lines an inner end view of said distributor.

The object of my invention is to provide a gas-producer whereby the coal may be distributed evenly and of uniform depth over the whole grate-surface; and it consists of a distributor comprising a series of helically-arranged radial longitudinal webs or blades made narrower at their inner than their outer ends, said distributor being arranged horizontally and radially to the center of the producer and mounted on a shaft fitted to turn on a rotary cover having means for supporting and turning it and also combined with a box or receptacle, in which it is arranged, embodying certain features whereby in connection with the distributor the aforesaid even distribution of coal is facilitated.

My invention also consists in the combination of said distributor and receptacle with the old parts of the producer, as will be hereinafter more fully set forth.

To enable those skilled in the art to which my invention appertains to better understand the nature and purpose thereof, I will now proceed to describe it more in detail.

In the drawings, A represents the vertical walls of the producer; B, the rotary cover thereof previously alluded to; C, the coal-

distributor, also mounted on said cover; D, the coal-chute for conducting the coal to said distributor; E, the grate; F, the blast-pipe for introducing the air under said grate, and G the discharge-duct for conducting the gas from the producer.

The parts H represent a series of vertical radially-arranged pokers, which, in connection with their operating mechanism, constitutes the subject-matter of another separate application for improvements in gas-producers, filed in the Patent Office by me June 18, 1900, and bearing Serial No. 20,625. Only a brief description of said pokers and their operating mechanism will therefore be necessary in the present case.

The vertical wall A of the producer, which is circular in practice, is capped by a metal plate A', upon which are mounted a series of vertically-arranged wheels *b* and a toothed rack *c*. Said circular cap-plate also has formed at its inner edge an annular trough *d* to receive an annular vertical flange *e'* on a horizontal plate *e* to form a water seal when said trough *d* is filled with water. The wheels *b* are in practice arranged about equidistant apart in a circular line around the top of plate A' and are fitted to turn in suitable bearings on said plate. The cover B is adapted to rest and turn upon said series of wheels *b*, being provided upon its under side with an annular groove *f*, in which the peripheries of the wheels fit and turn when the cover is rotated thereon. Said rotation may be performed in any suitable and convenient manner. In this instance the outer circular edge of the cover is provided with a toothed rack B', extending entirely around its circumference, which engages with a horizontally-arranged gear *g*, fitted to turn in suitable bearings and driven by any suitable driving mechanism which may be connected therewith. Said gear *g* being small, a slow rotary movement is imparted to the cover B and parts mounted thereon, and by said rotation the distributor C is also rotated in the following manner: Upon the shaft C' of said distributor is mounted a bevel-gear I, which engages with the annular toothed rack *c* on plate A'. It is therefore obvious that when the cover B is rotated, as aforesaid, said bevel-gear I

being caused to travel over said rock *c* causes it to be turned, and thereby turns the distributor.

It is apparent that since the coal is deposited in circles by the rotation of the cover upon which the distributor is mounted and that since the diameter of the grate-surface increases from the center out a proportionate amount of coal, increasing from the center to the outside of said grate-surface, must be deposited thereon to evenly distribute the same over its whole surface, or, in other words, the coal must be deposited in greater quantity and more rapidly at the outer edge of the grate-surface than at any point toward its center, on account of the greater diameter or circular distance to be traversed and covered than at points nearer the center. In order that the distribution of coal may be thus graduated from a light deposit at the center of the grate-surface and gradually increasing in volume to the outer edge thereof, I make the longitudinal webs or blades C^2 of the distributor narrow at their inner ends near the vertical center of the producer and gradually increasing in width from said point to their outer ends, thus forming pockets for the reception of the coal between said blades or webs very shallow at the inner end of the distributor and increasing in depth and capacity toward the outer end thereof, as is fully shown in the drawings. By this construction it is obvious that as the coal is deposited from the chute D onto the distributor it is in turn discharged from said distributor onto the grate-surface in gradually-increasing quantity from the center to the outside of said grate-surface, and in consequence an even distribution or deposit of uniform depth is constantly maintained over the whole grate-surface. To facilitate said uniform distribution of the coal, the blades of the distributor are arranged radially and helical-shaped, as is shown in Figs. 1 and 3 of the drawings, and a cone-shaped receptacle or box J is formed at the bottom of chute D, conforming in shape to the general contour of the distributor, in which the distributor is arranged, and having an opening J' for the discharge of the coal therefrom into the combustion-chamber K of the producer. The coal is not discharged directly from the distributor into the producer, but is first deposited on the bottom curved surface J^2 of the receptacle or box J and from there pushed by the blades of the distributor into the producer. The coal discharged from chute D onto the distributor lies in the pockets thereof between its helically-shaped blades C^2 and the inner circular surface of receptacle J until the edge of each blade arrives at the discharge-opening J', when it is gradually pushed by the rotation of the distributor from the surface J^2 into the combustion-chamber of the producer, as aforesaid. The radial blades C^2 being helically-shaped and arranged as previously described, one part of one blade will be pushing the coal from a certain point

on the surface J^2 while another part of another blade will at the same time be pushing said coal from another point on said surface J^2 . Said blades of the distributor and the receptacle J are in practice so constructed and arranged in relation to each other that a constant even discharge is maintained throughout the length of the distributor, with an increase in quantity, of course, as previously described, from the inner to the outer end of said distributor. Assuming that the inner narrow end of one of the blades C^2 arrives at the opening J', the spiral or helical-shaped edge thereof at once commences to push the thin layer of coal at said end through said opening, and as the distributor continues to rotate the edge of a wider and still wider part of the blade arrives at the opening, and consequently a gradual increase in the discharge of the coal is effected, as aforesaid. Before the edge of each blade at its outer end or widest part has passed by the edge of opening J' the inner narrow end of the next succeeding blade has come into action for discharging the coal, and consequently a constant uniform discharge is maintained, as also previously stated. While the coal is being thus deposited over the grate-surface, it is necessary in order to obtain a perfect combustion thereof to poke said coal in some manner while it is being thus deposited. This operation has commonly been done by the attendants by hand, although some mechanical devices for this purpose have been used. In my improved producer I propose in practice to do said poking mechanically and by automatic mechanism connected with the pokers H, previously referred to. Said poking mechanism, as also previously stated, constitutes the subject-matter of a separate application, and it will therefore be unnecessary to give more than the following general description thereof to make clear the purpose and advantages of my improved distributing device.

Vertical intermittent reciprocating movements are imparted to the pokers H independent of the rotary motion of cover B by means of the vertically-arranged pneumatic cylinders L, which are arranged in line radially to the vertical center of the producer, each poker being an extension of the piston L' of each cylinder, and each is operated independently and at different speeds by mechanism substantially alike. The cylinders and their pokers being arranged in a radial line, as aforesaid, it is obvious that the circumference of the circle which each traverses increases from the inner to the outer one. Therefore the inner pokers do not have to be operated as many times in each rotation as the outer ones in poking the coal, at equal distances apart, and are therefore operated at longer intervals between each downward stroke than said outer ones. The speed of the stroke itself may be the same for all of them; but the interval between said strokes must be reduced less and less in proportion to the increase in

the circumferential distance that each poker has to travel at each revolution of cover B, each poker being designed to punch the coal the same distance apart—about one foot apart in practice. The pokers H are arranged to be thus operated in the following manner: Pneumatic pressure is applied to each separate cylinder L to operate its respective piston L' and poker H by means of conducting-pipes M, which may be connected with any suitable source of supply. In this instance it is shown as being supplied from a combined air and water pipe comprising the inner water-pipe N and the outer air-pipe N', having a distributing device O combined therewith, into which the air and water flows and is distributed—the air through the pipe P to a pipe Q, with which the pipes M connect, and the water through a pipe R to a pipe S, from which connection is made by rubber tubing T with the upper end of a pipe U, which in practice extends down through each piston and poker to cool the same, the water thus introduced flowing up and out at the top through a discharge-pipe V.

The supply of air and water to the cylinders for independently operating their pistons and the pokers at different speeds, as and for the purpose previously described, may be regulated in various ways, and as I make no claim thereto it is deemed unnecessary to describe the same.

It will at once be apparent to those skilled in the art to which my invention appertains that by the use of an automatic distributor such as herein shown and described, whereby a uniform depth of coal-bed is always maintained over the entire grate-surface when properly poked, as aforesaid, during the period of deposit, a very perfect combustion is effected and maintained during the whole time the producer is in operation. Consequently a superior quality of gas is produced and at a minimum expenditure in stock and labor, aside from the advantage of reducing the liability to injury of the workmen by em-

ploying mechanical and automatic mechanism for both the distribution of the coal and the poking thereof.

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

1. In a gas-producer having a stationary grate and rotary cover, the coal-chute and the receptacle at the bottom thereof mounted on said rotary cover, and having a cone-shaped interior; also provided with a discharge-opening at the bottom and a curved surface to hold the coal until pushed therefrom through said opening into the producer-chamber, in combination with the rotary, cone-shaped distributor, arranged in said rotary receptacle over said discharge-opening, and provided with a series of radial, helical or spiral shaped blades made narrower in width at their inner than their outer ends and with the edge of one end of each blade substantially in longitudinal alinement with the edge of the opposite end of the next adjoining blade, substantially as and for the purpose set forth.

2. In a gas-producer having a stationary grate, the body, the rotary cover, the rotary chute, the receptacle at the bottom thereof mounted on said rotary cover and made cone-shaped upon the interior, also provided with a discharge-opening at the bottom, and a curved surface to hold the coal until pushed therefrom into said opening, in combination with the rotary, cone-shaped distributor, arranged in said rotary receptacle over said discharge-opening, and provided with a series of radial, helical or spiral shaped blades made narrower in width at their inner than their outer ends and with the edge of one end of each blade substantially in longitudinal alinement with the edge of the opposite end of the next adjoining blade, substantially as and for the purpose set forth.

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