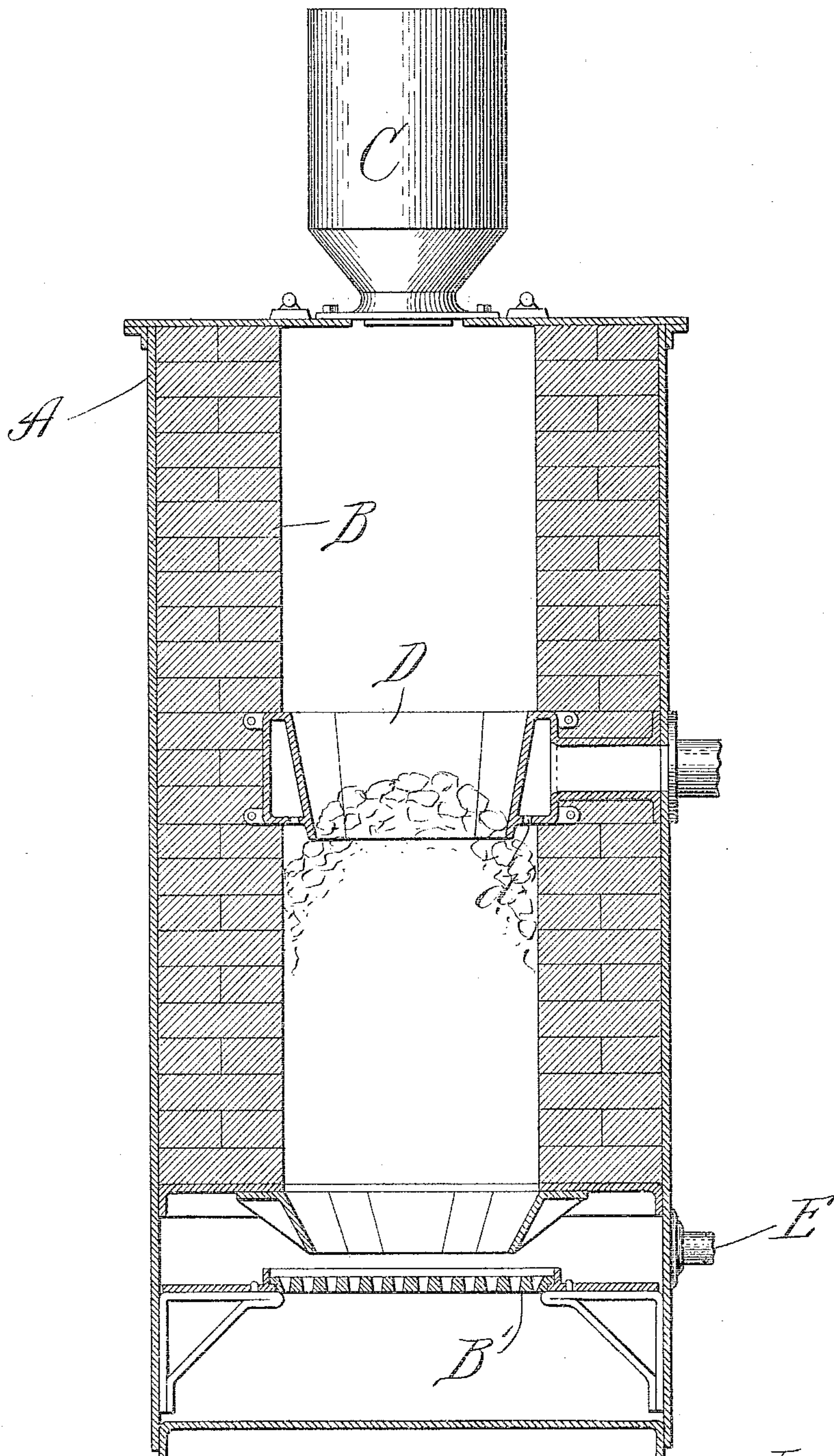


C. A. HARVEY.
GAS PRODUCER.
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953,614.

Patented Mar. 29, 1910.



Witnesses:

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UNITED STATES PATENT OFFICE.

CHARLES A. HARVEY, OF CHICAGO, ILLINOIS, ASSIGNOR TO PRODUCER GAS UTILITIES COMPANY, A CORPORATION OF ILLINOIS.

GAS-PRODUCER.

953,614.

Specification of Letters Patent.

Patented Mar. 29, 1910.

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To all whom it may concern:

Be it known that I, CHARLES A. HARVEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Gas-Producers, of which the following is a specification.

My invention relates to certain new and useful improvements in gas producers, and is fully described and explained in the specification and shown in the accompanying drawing, which is a vertical-longitudinal section through my improved producer.

The producer of this application is that shown and described in an application filed January 6, 1908, Serial No. 409450, from which this case has been divided. The construction herein shown is the producer proper as illustrated in the foregoing application and it is limited to that part of the entire apparatus in which the gas formation itself takes place.

The producer is metal-sheathed in the usual manner by an outer sheath A and is provided with a fire-brick lining B, inclosing a combustion space at the lower end of which is a grate B¹ and at the upper end of which is mounted a feeding-device or magazine C for the insertion of fuel. This magazine, as far as the present invention is concerned may be of any desired construction, although I prefer to use the form described and claimed in said original application which from the division therefrom of the present application and other features has been restricted to the magazine construction.

About midway of the fire-brick lining B is mounted an eduction conduit D, annular in form and made hollow with a cross-section which is roughly triangular or trapezoidal with its largest face downward and projecting inward from the fire-brick lining as illustrated. Thus the upper edge of the conduit lies substantially flush with the inner wall of the lining of the producer while the lower edge of the conduit projects inward quite a distance so that a shoulder is formed, the construction being such that fuel can readily fall down and pass through the conduit without being obstructed in its passage. The lower face of the conduit is provided with a series of perforations *d* whose combined area does not exceed the cross-

tional area of the eduction-conduit. The eduction-conduit is provided with a laterally extending nipple which is secured to the intake-pipe of the saturator which is in practice ordinarily combined with the producer for the purpose of saturating the air which is to act on the fuel. In practice the producer proper is filled with fuel in the usual way and suction is applied in the usual manner so that thereupon the incoming saturated vapor will enter at the bottom of the producer, through an intake-pipe E, will pass up through the fuel-mass and be sucked out through the perforations *d* into the eduction-conduit D.

The construction is advantageous because it holds the fire level at a point well below the top of the producer whereby it is possible to have a large amount of reserve-fuel in the combustion-chamber which will automatically feed itself down to supply gas for a considerable period, because the center of the producer is left free and unobstructed so that the heated mass of fuel can be manipulated from above without difficulty and also because more perfect results are produced in operation, for reasons which will now be explained.

By reason of the fact that the combined area of the perforations in the lower face of the eduction-conduit is less or not greater than the cross-sectional area of the conduit, the suction exerted by all of said perforations is substantially equal, so that there is an equally distributed annular suction-line around the lining of the producer at the line of the eduction conduit. The gas is thus drawn out from the upper-surface of the fuel-mass evenly around the said mass and the gases which combine with fuel are broken up and evenly distributed in their passage throughout the entire fuel-body. As a result, the combustion is perfectly even at all parts of the producer and there are no points of intense draft which might tend to form local heat-zones of extraordinarily high temperature. In prior practice it has been very common to have the eduction conduit so arranged as to bring about zones of intense heat in the producer in which zones, clinkers were very rapidly formed so as to interfere with the working of the apparatus. In order to prevent such localized heat it

has been necessary to raise the hydrogen content of the gas by introducing a large proportion of water-vapor so as to cool the fuel-mass or to resort to other practices equally unsatisfactory. With my construction it is possible to use a very low hydrogen content in the gas without generating localized heat-zones for the reason that the draft is equally and uniformly distributed throughout the entire fuel-mass and there can be no localized heat-zones wherein clinkers may originate. My producer will, therefore, give rise to a gas with a low hydrogen content which can be used very efficiently and economically in internal combustion engines, in fact much more efficiently and economically than any gas with a high hydrogen content which burns so rapidly in an internal combustion engine as to be unsatisfactory for power purposes.

It will thus be seen that the producer is arranged to permit a wide range in the constituents of the gas manufactured, for of course a high hydrogen content can be obtained when desired in the usual manner and yet the use of the apparatus will not produce an undue formation of clinkers which will tend to upset the practical operation thereof.

It will be noted that the ports *d* are located a sufficient distance above the lower edge of the eduction conduit D and in vertical line with the combustion chamber, whereby there is an annular space between the fuel in the combustion chamber and said ports, and said ports are kept free from clogging by the fuel; also that said ports exert an upwardly direct suction action on the gases.

I realize that considerable variation is possible in the details of construction of my improved device, without departing from the spirit of my invention, and I do not intend therefore, to limit myself to the specific form herein shown and described.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a producer, the combination with a combustion chamber, of an eduction-conduit therein comprising a gas-receiving chamber, a funnel-shaped fuel conducting passage through said chamber, a series of vertical ports in the bottom of said chamber to conduct the gas thereto, and a connection with

said chamber to conduct the gas therefrom, as set forth.

2. In a producer, the combination with a combustion chamber, of an eduction-conduit therein and having a lower horizontal flanged portion, of a series of vertical ports in said flange the total cross-sectional area of which is so proportioned with relation to that of the eduction-conduit as to cause the suction exerted by said ports to be substantially uniform, for the purpose set forth.

3. In a producer, the combination with a combustion chamber, of an eduction-conduit therein and having a vertical inwardly converging portion, and a horizontal flanged portion above the plane of the lower edge of said vertical portion, of a series of vertical ports in said flange the total cross-sectional area of which is so proportioned with relation to that of the eduction-conduit as to cause the suction exerted by said ports to be substantially uniform, for the purpose set forth.

4. In a producer, the combination with a combustion chamber, of an eduction-conduit therein and comprising upper and lower horizontal portions inclosing a gas chamber, a vertical inwardly converging portion the lower end of which extends below the plane of the lower horizontal portion, and a series of vertical ports in said lower horizontal portion the total cross-sectional area of which is so proportioned with relation to that of the eduction-conduit as to cause the suction exerted by said ports to be substantially uniform, for the purpose set forth.

5. In a producer, the combination with a combustion chamber, of an eduction-conduit therein and comprising upper and lower horizontal portions inclosing a gas chamber, a series of vertical ports in said lower horizontal portion, and a vertical inwardly converging portion the lower end of which extends beyond the plane of said lower horizontal portion, whereby the fuel is deflected below said lower horizontal portion and the ports therein shielded from clogging.

CHARLES A. HARVEY.

In the presence of—

CHAS. E. GAYLORD,
RALPH A. SCHAEFER.