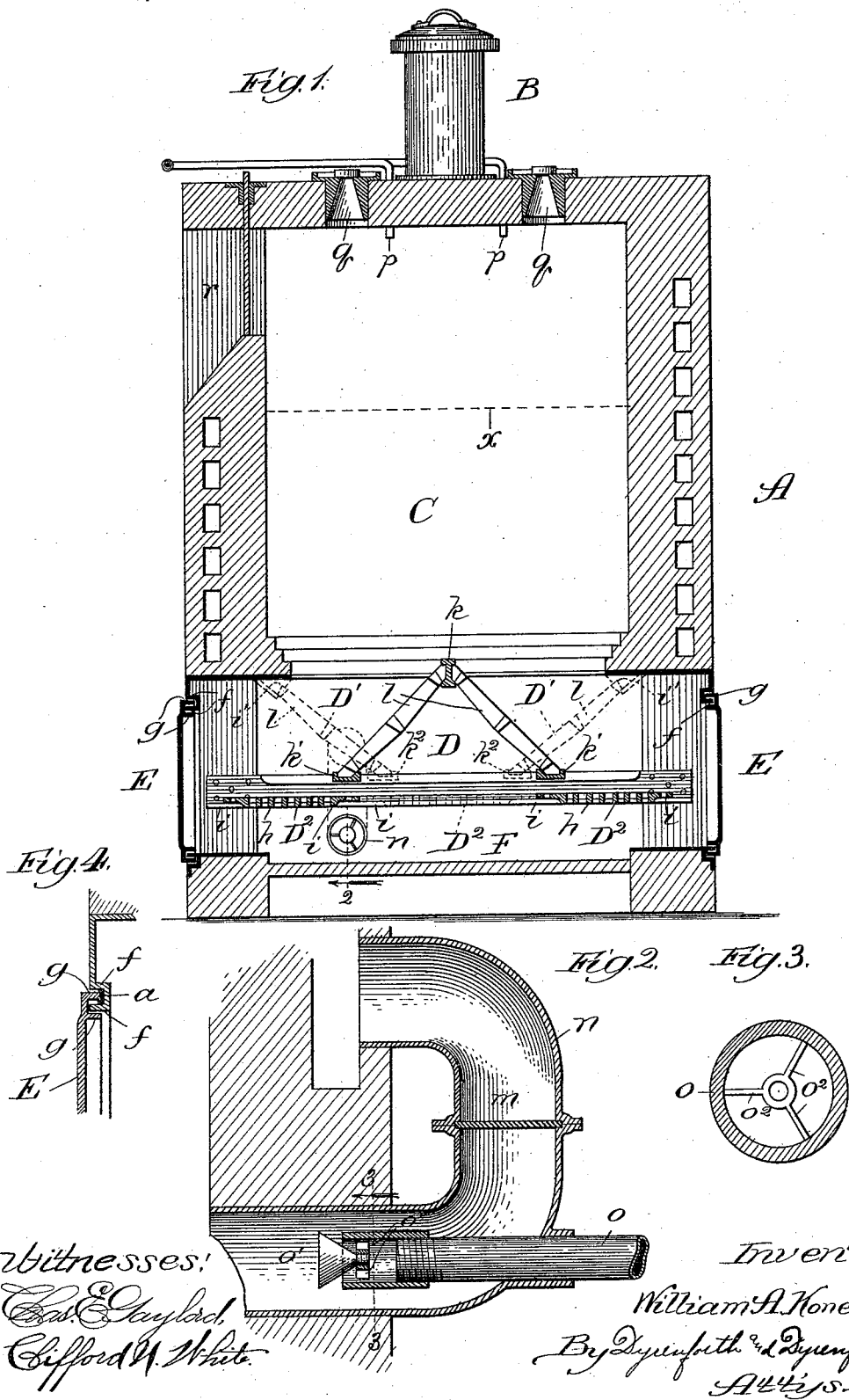


(No Model.)

W. A. KONEMAN.
GAS PRODUCER.

No. 485,391.

Patented Nov. 1, 1892.



UNITED STATES PATENT OFFICE.

WILLIAM A. KONEMAN, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE CHICAGO
HEAT STORAGE COMPANY, OF SAME PLACE.

GAS-PRODUCER.

SPECIFICATION forming part of Letters Patent No. 485,391, dated November 1, 1892.

Application filed September 18, 1891. Serial No. 406,111. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. KONEMAN, 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 an improved construction of apparatus designed particularly for making gas according to a process set forth in my Letters Patent of the United States No. 469,858, dated March 1, 1892, and which involved, generally stated, in addition to blasting the bed of fuel from below in a producer with air or with air and steam, the injection into the upper side of the producer of steam for its effect in retarding the distillation from the coal of its hydrocarbon vapors and for the improved quality it affords to the product.

The essential construction of my improved apparatus involves for carrying out the said process a shell containing the generating-chamber having any suitable form of grate at its base to support the fuel-bed, an air-blast and a steam-supply below the grate, a feeding apparatus at the upper part of the shell, one or more steam-pipes adapted to impinge steam against the upper surface of the bed, and an outlet for the resultant gas, which is necessarily entirely, or practically so, above the plane of the height to which the top surface of the bed of fuel is intended to reach.

The apparatus illustrated in the accompanying drawings is shown to involve the general construction thus outlined, and, besides, peculiar, as also peculiarly-effective, detail constructions of a grate, a combined air-blast and steam-supply, and doors leading to the base of the fuel-chamber.

Referring to the drawing, Figure 1 is a vertical section of my improved producer. Fig. 2 is a broken section of the same enlarged and showing the air-blast and steam-supply detail, the section being taken on the line 2 in Fig. 1 and viewed in the direction of the arrow. Fig. 3 is a sectional view taken on the line 3 of Fig. 2, enlarged, and viewed in

the direction of the arrow. Fig. 4 is an enlarged broken view showing the door construction.

A is a gas-generator involving a shell of brick, the interior of which forms a generating-chamber C, having a grate D at its base, the walls having air-spaces, as shown, from which the air for the blast may be taken in a heated condition, and any well-known or suitable form of feed-hopper B being provided in the roof. An outlet *r* for the generated gas is provided in the shell above the plane of the bed of fuel, the approximate line of the top surface of which is indicated at *x*. The roof of the generator is also provided, as usual, with a number of openings *q*, through which to stoke and examine the condition of the fire, and which are provided with convenient closing means, as indicated.

Through the roof of the generator I introduce one or more steam-pipes *p*, adapted to impinge steam against the upper surface of the bed of fuel in the chamber C, and which may be branches of the steam-pipe *o*, which leads into the generator below the grate D, and which I extend horizontally into the air-pipe *n* for the blast. The air-pipe *n*, of which more than one may be provided, if desired, leads from the air-space in the wall of the shell near the line of the grate outside the generator and returns into the same below the grate, and should be provided about midway of its length with a horizontal slide-valve *m* for regulating the supply of air for the blast, and through the lower horizontal portion of the pipe *n*, I extend the steam-pipe *o* and provide the latter with a flaring nozzle *o'*, supported by radial ribs *o''*. By this construction the steam from the pipe *o* not only creates a suction for drawing in the air, the quantity supplied of which may be regulated by the valve *m*, but the flaring form of the nozzle *o'* causes it to impinge the steam around the inner wall of the air-pipe, thereby creating a vacuum therein and enhancing the operation of the steam-pipe as an injector, and thus enabling the larger amount of fuel to be burned on the grate. By connecting the hot-air space in the wall of the

shell with the interior of the shell below the grate by means of a pipe *n* the operation of the apparatus is rendered noiseless, the pipe affording a muffler and effectually overcoming the great noise attending the operation of gas-generators into which the air-blast is introduced in the ordinary way.

I form the grate *D* with a stationary upper part *D'* and a sliding bottom part *D*². One form of my improved grate is shown in full lines in the drawings and the other is indicated by a dotted representation. In the first named the part *D'* comprises grate-bars *l*, sustained at their upper ends by a support *k* at the center near the base of the fire-chamber, and extending thence obliquely downward and outward, being sustained at their lower ends on supports *k'* at opposite sides of the center of the feed-chamber. The spaces at the opposite sides of the base of the inverted-V-shaped part of the grate *D* are provided with grate-sections *h*, supported on ledge *i*, upon which they may be readily slid in and out through the openings provided with the doors *E*, hereinafter described. In the construction of the grate represented by dotted lines the bars *l* of the stationary part *D'* are supported at their upper ends on ledges *i'* at opposite sides of the fuel-chamber and inclined thence downward to a common center or line, being sustained by suitable supports *k*² at their lower ends, and the part *D*² of the grate is supported to afford a horizontal bottom for the open base of the part *D'* and to permit it to be slid in and out through the aforesaid doorway.

The last-named construction of my improved grate is clearly shown in my application for Letters Patent, Serial No. 406,112, filed concurrently herewith on the 18th day of September, 1891. This construction of grate is convenient in the way of enabling ash accumulations to be dumped into the ash-pit *F* without detriment to the bed of incandescent fuel, since the sliding section or sections *D*² may on opening the doors *E* be drawn out for the purpose and then returned to the normal position of supporting the fuel-bed without materially disturbing the latter. The space between the stationary inclined part *D'* and horizontally-sliding parts *D*² of the grate should be sufficiently wide to enable ashes and the smaller clinkers to be raked out through it, thus without requiring the sliding base of the grate to be withdrawn, which then need only be done to remove large clinkers. Each door *E* is provided around its edges with double parallel inwardly-projecting flanges *g*. Around the edge of the doorway are provided similar parallel outwardly-projecting flanges *f*, the space between which should be packed, as shown at *a* in Fig. 4, with some non-conducting packing, such as asbestos, mortar, fire-clay, or the like. The doorway-flanges *f* are so placed that the up-

per of the door-flanges *g* will enter between them when the door is closed and the lower flanges *g* will pass under the lower flanges *f*. Thus the closed doors effectually seal the door-openings, preventing the possibility of the escape of heat and products of combustion through them. Obviously if only one of the flanges *f* or *g* were provided the sealing effect would be afforded, and I desire to be understood as not limiting my improvement in this respect to the two flanges each on the door and door-opening, though the latter is preferred.

To operate the apparatus, a coal fire is made on the grate *D* and blasted with air and steam from below, the blast being continued, preferably, throughout the operation, though the amount of air introduced may be regulated at will through the medium of the damper *m* according to the condition of the fire. When the apparatus has become sufficiently heated, steam from the pipes *p* is let onto the incandescent bed of fuel and continued, by preference, uninterruptedly throughout the operation, thereby not only cooling the incandescent bed, and thus retarding distillation of the vapors from the deposits of fresh coal introduced from time to time, as usual, through the hopper, but also impinging steam against the deposits as and after they are introduced, and thus further retarding distillation.

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

1. In a gas-generator, the combination of a shell containing the generating-chamber provided with an outlet for the resultant gas and a grate *D*, formed in parts *D'* and *D*², the former comprising stationary inclined grate-bars *l* and the latter being supported and forming a horizontally-sliding bottom below the open base of the said stationary part, the parts *D'* and *D*² having ample space between them for the removal of ashes and clinkers without disturbing the sliding bottom, substantially as described.

2. In a gas-generator, the combination of a shell containing the generating-chamber provided with an outlet for the resultant gas and a grate *D*, formed in parts *D'* and *D*², the former comprising stationary grate-bars inclining downward and outward from a common center and the latter forming a horizontally-sliding bottom supported at a distance below the part *D'*, affording between the two parts ample space for the removal of ashes and clinkers without disturbing the sliding bottom, substantially as described.

3. A gas-generator comprising, in combination, a shell containing a generating-chamber provided at its upper end with a coal-feeding device and with stoke-holes *q* and in its base with a grate *D*, formed in parts *D'* and *D*², the former comprising stationary inclined grate-bars *l* and the latter being supported and forming a horizontally-sliding bottom at

a distance below the part D', affording between the two parts ample space for the removal of ashes and clinkers without disturbing the sliding bottom, air and steam supply
5 pipes leading into the chamber below the grate, a steam-supply pipe *p*, leading downward into the same from above, and an out-

let above the plane of the fuel-bed for leading off the resultant gas, substantially as described.

WILLIAM A. KONEMAN.

In presence of—

J. W. DYRENFORTH,

M. J. FROST.