F. FIELDEN.

GAS PRODUCER.

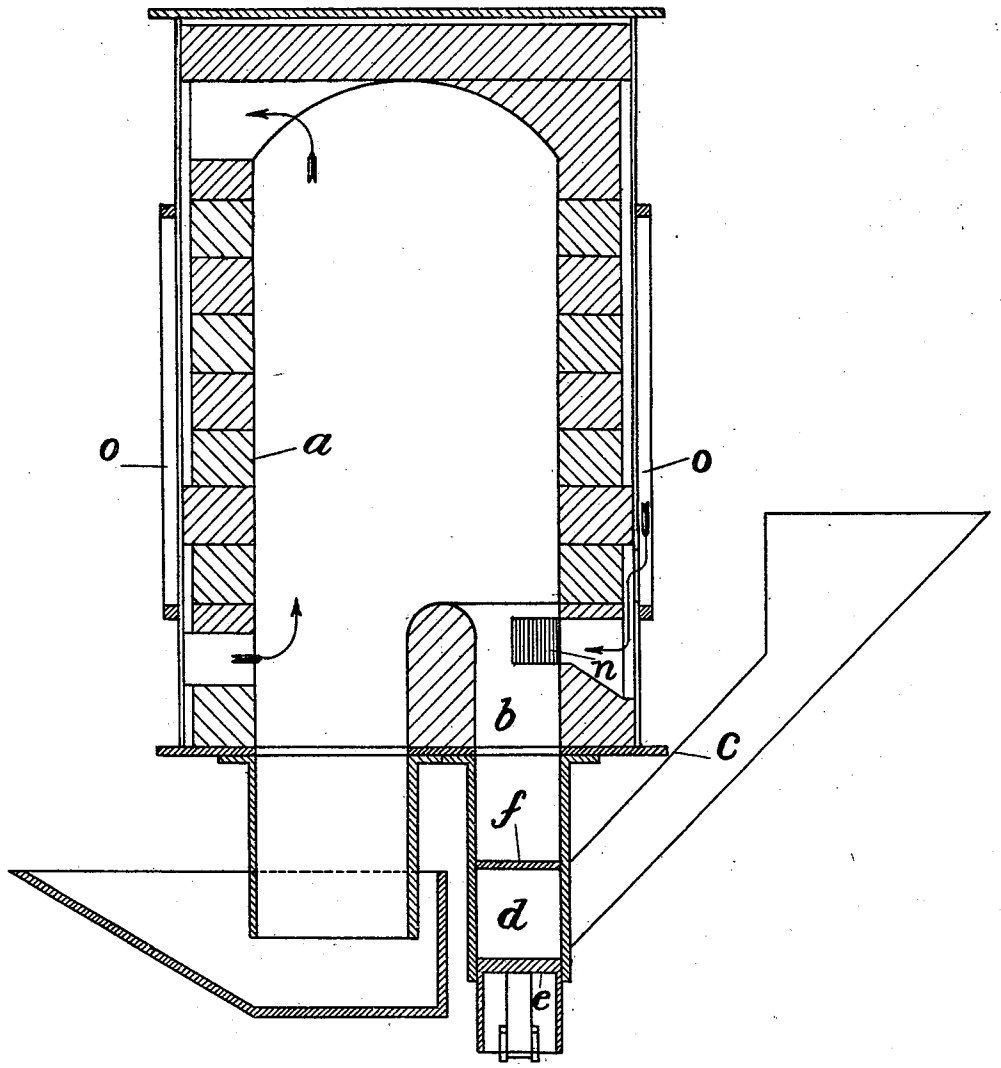
APPLICATION FILED JAN. 10, 1911.

992,491.

Patented May 16, 1911.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 2.

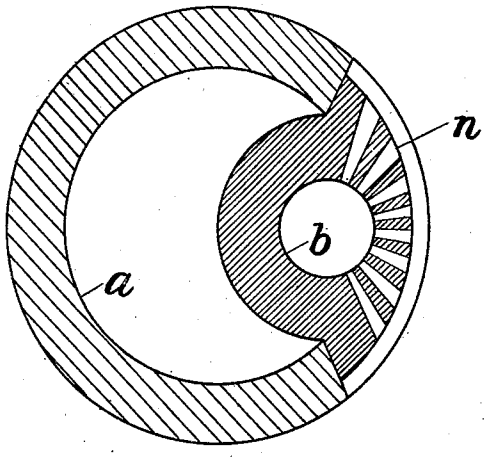
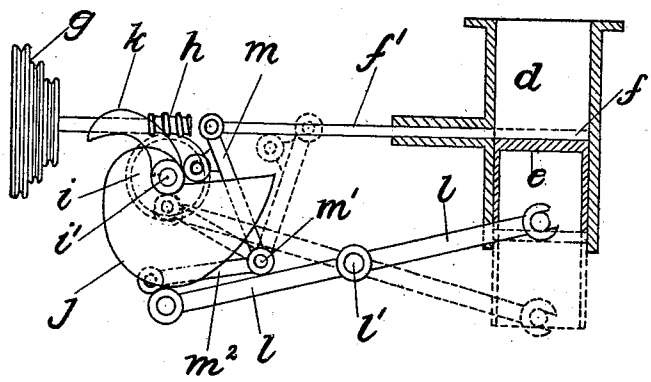


Fig. 3.



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FRANK FIELDEN, OF RIVER VIEW, NEW FERRY, ENGLAND.

GAS-PRODUCER.

992,491. Specification of Letters Patent. Patented May 16, 1911.

Application filed January 10, 1911. Serial No. 601,775.

To all whom it may concern:

Be it known that I, FRANK FIELDEN, a subject of the King of Great Britain, residing at River View, New Ferry, in the county of Chester, England, have invented new and useful Improvements in Gas-Producers, of which the following is a specification.

My invention relates to improvements in that class of gas producers primarily designed for use with bituminous fuel, in which the coking of the fuel is effected in a short distillation or coking chamber situated at the base of the fire bed within the gas producer proper and passing a convenient distance upward into the fuel bed, which is fed by fuel forced upward through the chamber by means of a suitable feeding device.

My improvements in this class of apparatus consist essentially, first, in consuming the tar and other hydrocarbons given off in the process of distillation in the coking chamber; and I effect this by admitting a supply of hot air, obtained from a jacket surrounding the generator proper, through a series of apertures arranged around or partially around the interior of the distillation chamber.

My second improvement consists of a particular improved appliance for effecting the upward feed of the fuel into the coking and distillation chamber and (after distillation and elimination of the tarry products) into the fuel bed of the gas producer proper.

In order that my invention may be fully understood and readily carried into effect I will describe the same with reference to the accompanying two sheets of drawings, in which—

Figure 1 is a sectional elevation of my improved gas producer, Fig. 2 is a sectional plan of the same taken through the air inlet ports of the coking chamber, and Fig. 3 is a detail view of my improved feeding appliance for supplying the distillation or coking chamber with fuel by an upward feed.

In carrying my improvements into effect I employ a distillation or coking chamber *b* within the body of the generator proper *a*. This coking chamber *b* is of considerably less area than the generator proper in which it is placed, eccentrically as shown or concentrically and near the bottom. The bore of the chamber *b* may be parallel with its axis as shown in Fig. 1 or it may follow the contour of a section of an inverted cone, so as to give a gradually increased area for the passage of the heat-expanded fuel. The coking chamber *b* is supplied with bituminous fuel (or other fuel) by an upward feed, the fuel being forced upward from a supply chute *c* or equivalent device by any convenient feeding appliance, but preferably by my improved feeding appliance as illustrated in the drawings. I employ a charging cylinder *d* with a reciprocating trunk piston *e* in combination with a sliding valve plate or damper *f* to feed the fuel upward from the supply chute *c* and into the bottom of the coking chamber *b*. The stroke of the piston *e* forcing up the fuel from the charging cylinder *d* into the chamber *b* also forces the distilled fuel in the form of coke from the chamber *b* into the producer proper *a* and delivers a fresh charge of green fuel into the chamber *b*, the new charge being supported by the valve plate or damper *f* which is inserted by suitable automatic mechanism just before the trunk piston *e* is withdrawn, and is preferably retracted as soon as the piston returns with a fresh charge.

The automatic intermittent feed mechanism illustrated in Fig. 3 consists of a stepped rope pulley *g* driven constantly in one direction by a rope, not shown, and thereby rotating the worm shaft *h* which drives a worm wheel *i* on a shaft *i'* on which is fixed the fuel feeding cam *j* and the fuel cut-off cam *k*. The fuel feeding cam *j* raises the piston *e* by means of a lever *l* fulcrumed at *l'*, and the fuel cut-off cam *k* inserts the sliding valve plate or damper *f* by means of the pivoted cut-off lever *m* which is fulcrumed at *m'* and connected by a rod *f'* to the valve plate or damper *f*. The cam *k* in its continued rotation comes in contact with an arm m^2 of the lever *m* and presses it down into the lower position indicated by full lines, thereby retracting the valve plate or damper *f*. Instead of the face cams *j* and *k* I might employ shell or hollow cams or any suitable equivalents for imparting a positive movement in both directions to the trunk piston *e* and sliding valve plate or damper *f*.

I am aware that it has previously been proposed in a mechanical upward feeding device for feeding fuel into furnaces, fireboxes and fire-grates to employ a cam-oper-

ated piston and a sliding plate to maintain the fuel in position, both the piston and the sliding plate being operated by one and the same cam or crank from a rocking shaft. In my improved feeding appliance, however, I employ two separate cams *j* and *k* for respectively actuating the piston *e* and sliding valve plate *f* with this advantage that I can so time the movements of the valve plate as to make it act as a regulator of the amount of coal fed every revolution of the cam shaft which is constantly rotated in one direction. For example, I can so arrange the shapes and relative positions of the cams that the sliding valve plate *f* is retracted before the piston *e* has quite completed its downward stroke, thus allowing some of the fuel previously pushed up into the upper part of the cylinder to drop down again, and so prevent an excessive amount of fuel from falling into the cylinder from the hopper.

The coking chamber *b* is supplied with air, preheated in any convenient way, as by a series of radial or other slots *n* see Fig. 2, fed by an air jacket *o* around the gas producer proper *a*, and the gas producer proper is supplied with air and steam or vapor if required in any known and suitable manner. The tarry gases distilled from the fuel during its passage through the coking chamber *b* are consumed by combustion with the hot air delivered from the air jacket *o* through the radial slots *n* or equivalent parts into the chamber *b* and prior to the delivery of the coked fuel into the generator proper. The heat from the fuel in the generator proper *a* keeps the coking chamber *b* hot so that the fuel is heated in the chamber previous to reaching the point of air admission slots *n*.

By restricting the area through which the green fuel passes and concentrating the hot air supply to a limited zone, *i. e.*, to the coking chamber *b*, each particle of fuel is supplied with the necessary amount of oxygen to insure as nearly as possible the complete combustion of its tarry constituents.

What I claim as my invention and desire to secure by Letters Patent of the United States is:—

The combination with a gas producer having a distillation or coking chamber placed preferably eccentrically within its base and means for supplying said chamber with bituminous or other fuel by an upward feed, of an air jacket surrounding the gas producer, said gas producer being provided with apertures communicating with said air jacket and with said coke chamber, whereby heated air will be conducted from the former to the latter.

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

FRANK FIELDEN.

Witnesses:
JAMES STUART TADMAN,
JAMES STANLEY TAYLOR.