H. F. SMITH.

GRATE FOR GAS PRODUCERS AND MEANS FOR REMOVING ASHES THEREFROM.

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928,809. Patented July 20, 1909.

Fig. 1.

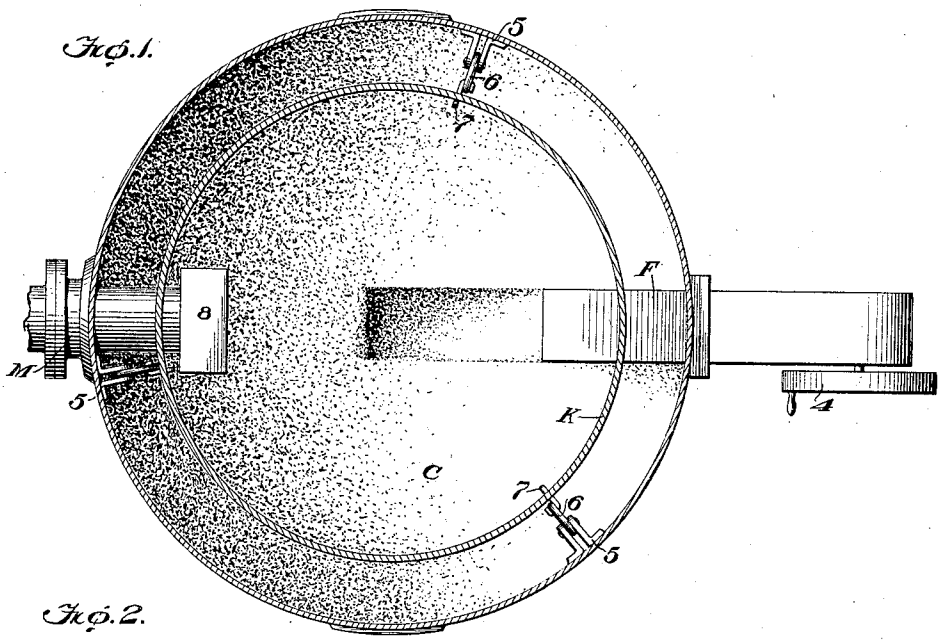
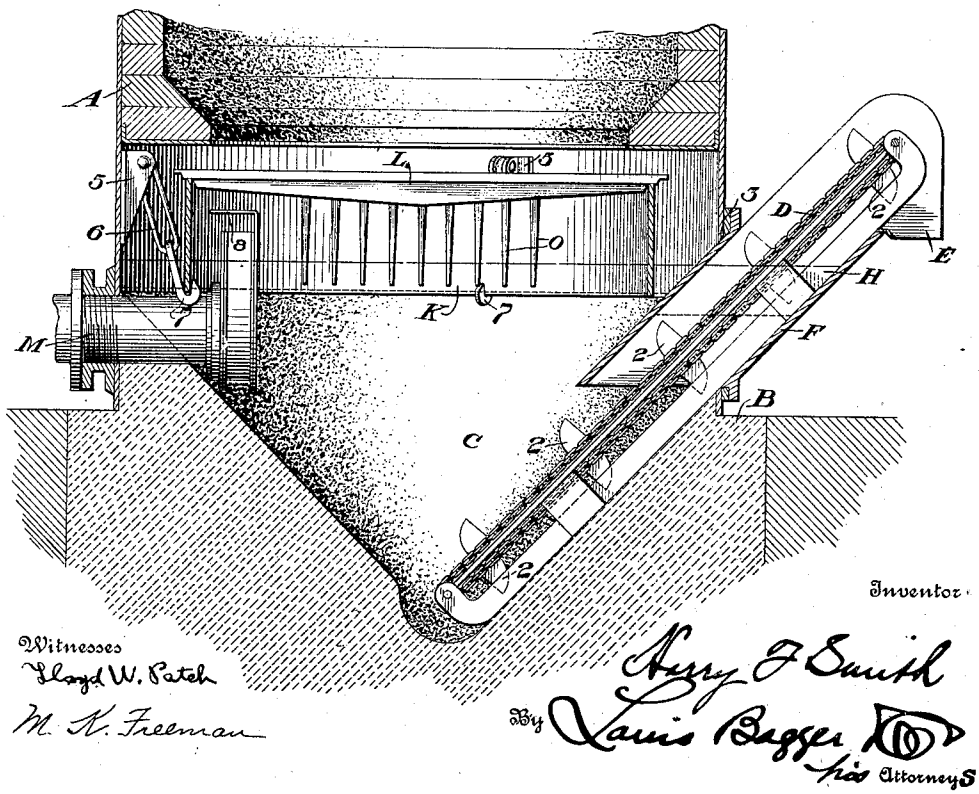


Fig. 2.



Witnesses

Lloyd W. Fatch

M. K. Freeman

Inventor

Harry F. Smith

By Louis Bagger & Co

his Attorneys

UNITED STATES PATENT OFFICE.

HARRY F. SMITH, OF LEXINGTON, OHIO.

GRATE FOR GAS-PRODUCERS AND MEANS FOR REMOVING ASHES THEREFROM.

No. 928,809. Specification of Letters Patent. Patented July 20, 1909.

Application filed October 10, 1908. Serial No. 457,143.

To all whom it may concern:

Be it known that I, HARRY F. SMITH, a citizen of the United States, residing at Lexington, in the county of Richland and State of Ohio, have invented certain new and useful Improvements in Grates for Gas-Producers and Means for Removing Ashes Therefrom, of which the following is a specification.

My invention relates to an improvement in grates for gas producers and means for removing ashes therefrom, and the object is to provide means whereby the removal of ashes from the ash pit may be accomplished without the ingress or egress of air from the ash pit. This is accomplished by forming a liquid seal within the ash pit, permitting the removal of ashes from the ash pit without changing the water level within the producer or ash pit, even when there is considerable change in the draft pressure.

A further object is in the provision of a steel ring which is suspended so that a portion of the ring extends into the liquid seal. Mounted upon the ring is a grate which is kept cool by the contact of the water with the ring and the projections from the grate which extend into the water. In supporting a grate in this manner, I am enabled to overcome the objection of channeling along the producer lining as the blasts of air are confined to the central part of the grate.

The invention consists of other novel features of construction and combinations of parts which will be hereinafter described and pointed out in the claims.

In the accompanying drawings:—Figure 1 is a top plan view, and Fig. 2 is a vertical sectional view.

A, represents the producer lining, the upper portion of the producer not being shown, and B, is the concrete foundation upon which the producer is mounted. The ash pit C is provided with sloping walls forming a pocket at the bottom to permit of the ashes being drawn or removed from the ash pit. A chain elevator D mounted in a frame H is adapted to extend down into the ash pit through an opening 2 formed in the side of the producer. A rectangular box or chute F extends through an opening which forms a housing for the elevator D. The elevator D is provided with buckets 2, 2, which are provided with perforated bottoms to permit of the drainage of the water therethrough as it travels up through the chute to discharge the ashes through the spout E at the upper end of the chute F. The ash pit C is filled with water forming a liquid seal which extends up into the producer lining A and into the chute F. The chute F besides forming a housing for the elevator D forms a water-seal preventing any ingress or egress of air into the ash pit, at any time, either when the elevator is being used to remove the ashes from the ash pit or when the elevator is idle. The elevator D is operated by means of a crank 4 or by a belt connection (not shown). In case it is necessary to repair the elevator at any time, the frame H which rests on the sloping wall of the ash pit and chute, forms a runner which permits of the elevator being slid into the ash pit, and for drawing it from the ash pit.

Under normal operating conditions, the ash pit is filled with water forming the seal as indicated by the full lines, but when the producer is operated under suction, the pressure within the producer shell will be somewhat less than that on the outside, and the water level within the box or chute F will fall to a lower point as indicated by the dotted lines, and the water level will recede in the ash pit to the point indicated by dotted lines. The difference in head between the water level within the producer and the water level within the chute F is sufficient to balance the lower pressure within the producer. Owing to the fact that the total area of the chute F is much smaller relatively to the total area of the water surface within the producer shell, the water level within the producer varies slightly with the variations in blast pressure.

Secured to the shell of the producer are brackets 5, 5, and suspended from the brackets are links 6, 6. Connected to the links are hooks 7, 7, which are adapted to support a scale ring, the lower portion of which extends down into the liquid seal. Supported upon the ring is a grate L. This construction provides for a space being formed within the ring and beneath the grate which is effectually sealed off from the rest of the ash pit and forms a space for the reception of the gas when the producer is operated by a down-draft. A tube or pipe M extends through the casing up within the ring and beneath the grate above the liquid seal, and this pipe forms an outlet for the gas. A lip 8 extends over the top of the tube or pipe M to prevent the ashes which pass through the

grate from falling into the pipe or tube, and thereby choking the pipe and preventing the gas from passing therethrough. When the producer is operated as a down-draft producer, the gas must pass into the space under the grate and within the ring as the gas must pass through the center of the grate before it can be discharged. If, however, the producer is being operated as an updraft producer, the blast is entirely confined to the grate surface, thus increasing the difficulty with which channels are formed along the producer lining. With this construction there can be very little variation in the water level, and it is possible to carry the water level much closer to the grate. In this way, the grates are kept at all times cool, and prevented from becoming warped and damaged by heat. The ring K extending down into the water will keep the grate cool to a certain degree, and it is possible to provide the grates with projections O which would extend downward and in contact with the water, and thereby convey heat from the grates by direct conduction.

By this invention, I have provided means for the removal of ashes from the ash pit without admitting air or changing the water level within the producer, even without considerable change in the draft pressure. By suspending a ring within the producer and supporting a grate thereupon, the blast is confined to the center of the grate, thereby preventing any possibility of channeling, and the gas can be drawn from the space beneath the grate by a tube passing through the producer lining. Again, means is provided for cooling the grate by direct contact with water, which is possible for the reason that there being no change in the water level, the water could be carried very close to the grate without involving any difficulty.

This invention is very important as it is possible to remove the accumulated ash from the ash pit without permitting the ingress or egress of air, while the producer is in operation. This result has been accomplished by the construction which is known as the water bottom producer, in which grates are not employed, the fuel burden resting on ashes, which are supported by the bottom of a water-tight basin, and in which basin the edge of the producer shell extends. This construction permits of the withdrawal of ashes while the plant is in operation, but does not permit of the use of grates, and is objectionable for the reason that any variation in the blast pressure causes a very considerable change in the level of the water contained within the bottom of the producer. In my apparatus, the area of the water exposed to the outside air is very small as compared with the total area of water within the producer shell so that a change in draft produces a variation in the outside water level sufficient to balance the difference in draft, but at the same time prevents any considerable change in the inside water level.

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

1. In a gas producer, the combination with an ash pit having a liquid seal therein, of a grate, a suspended ring for supporting the grate extending into the liquid seal, and means for removing the ash from the ash pit and maintaining the liquid seal in contact with the ring.

2. In a gas producer, the combination with a grate, of a ring for supporting the grate, an ash pit, having a liquid seal therein extending to the ring for confining the gas between the grate and seal, and means extending within the ring for removing the gas.

3. In a gas producer, the combination with an ash pit having a liquid seal therein, a ring, of means for suspending the ring, a grate mounted on the ring, said ring extending into the liquid seal and means for admitting the blast within the ring and confining it to the grate.

4. In a gas producer, the combination with a grate for supporting the bed of fuel of the producer, means for supporting the grate, of an ash pit, a liquid seal in the ash pit and extending around the supporting means of the grate, a removable chute extending through the side of the producer and a liquid forming a seal therein, and a removable conveyer extending through the chute into the ash pit for removing the ashes from the pit.

5. In a gas producer, the combination with a shell, an ash pit, of a ring, means connected to the shell for supporting the ring, a grate mounted on the ring adapted to receive the bed of fuel of the producer, a liquid seal in the ash pit extending to the ring and means extending within the ring for conducting the gas from the producer.

In testimony whereof I affix my signature, in the presence of two witnesses.

HARRY F. SMITH.

Witnesses:

SIDNEY L. EARHART,

W. H. EARHART.