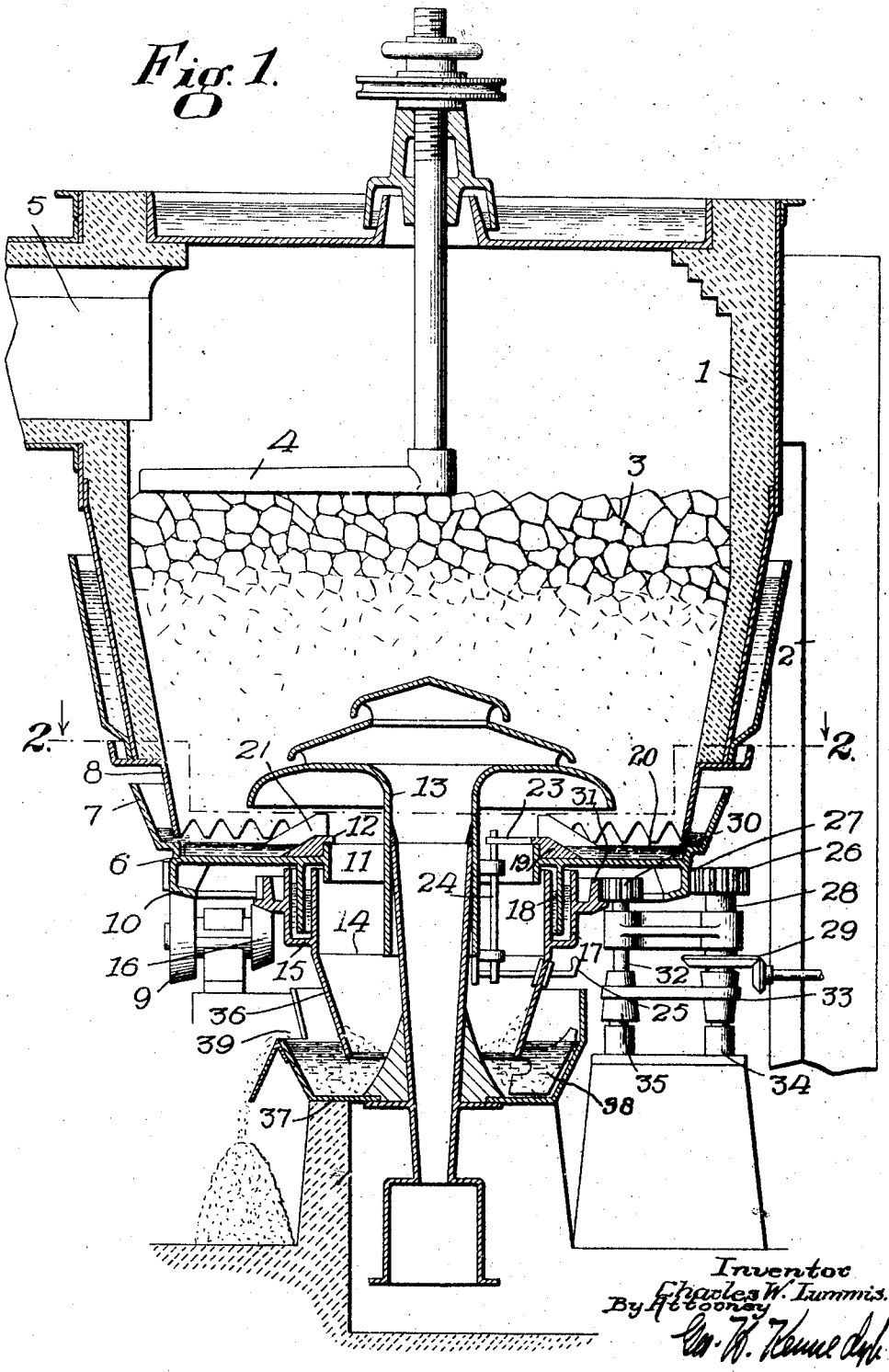
April 14, 1925. 1,533,931

C. W. LUMMIS

GAS PRODUCER

Filed March 15, 1920 2 Sheets-Sheet 1

Fig. 1.



Inventor
Charles W. Lummis.
By Mc Cooney
Chas. B. Keene Atty.

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Fig. 2.

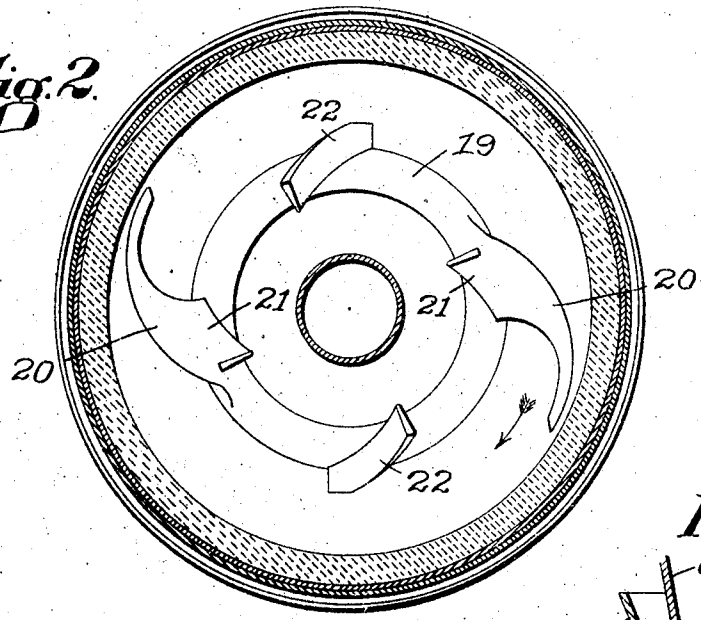


Fig. 4.

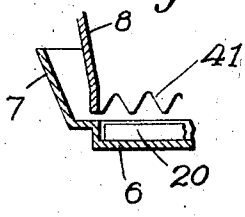
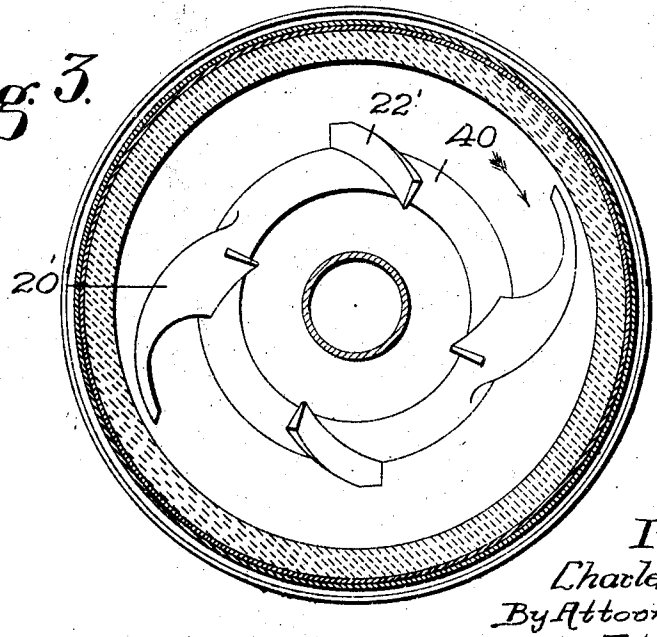


Fig. 3.



Inventor
Charles W. Lummis.
By Attorney.
Geo. B. Kennedy Jr.

Patented Apr. 14, 1925.

1,533,931

UNITED STATES PATENT OFFICE.

CHARLES W. LUMMIS, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO MORGAN CONSTRUCTION COMPANY, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

GAS PRODUCER.

Application filed March 15, 1920. Serial No. 365,990.

To all whom it may concern:

Be it known that I, CHARLES W. LUMMIS, a citizen of the United States, residing at Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in a Gas Producer, of which the following, together with the accompanying drawings, is a specification.

The present invention relates to gas producers, and in particular to the mechanism employed in devices of this class for effecting the discharge of ashes therefrom.

In common with the invention set forth and described in my copending application Serial No. 309,859, filed July 10, 1919, the present invention contemplates the discharge of ashes from the producer at the central or axial portion thereof. The present invention resides in the combination and arrangement of novel and improved instrumentalities for this purpose, as hereinafter described in detail, reference being had to the accompanying drawings, wherein—

Fig. 1 is a central vertical sectional view of a gas producer constructed in accordance with the invention.

Fig. 2 is a horizontal sectional view on the line 2—2 of Fig. 1.

Fig. 3 is a horizontal sectional view, similar to Fig. 2 illustrating a necessary variation in the construction of the ash plowing devices when the relative speeds of rotation between the parts are changed.

Fig. 4 is a fragmentary detail view in vertical section of certain parts near the bottom of the producer.

Like reference characters refer to like parts in the different figures.

The invention is herein shown as applied to a gas producer of conventional construction, the same comprising the usual stationary shell 1 which may be supported by posts or uprights 2, 2. The bed of fuel 3 that undergoes gasification in the shell 1 may be continuously agitated by any known device for this purpose, here shown as a rotating member 4 of ordinary construction. The gas which is produced by the combustion of the fuel makes exit from the shell 1 through the usual opening 5 that leads upwardly from the space above the fuel bed that is inclosed by said shell.

The fuel bed 3 in the shell 1 is superposed, as usual, on a layer of ashes, the latter being supported, as to its outer portion, upon an annular ash pan 6 which is adapted to receive within its flaring sides 7 an apron 8 that extends downwardly from the shell 1. The ash pan 6 is mounted for rotation, relative to the shell 1, upon an annular series of supporting rollers 9, 9, upon which travels a flange 10 provided by the under side of said ash pan. The central opening 11 of said ash pan, through which the ashes are discharged as hereinafter described, is surrounded by an upwardly projecting flange 12, that is high enough to maintain a sufficient depth of water in the ash pan to make a water seal with the apron 8 of the shell. Said water also serves to cool the ash pan 6 and prevent its burning out.

The ashes that underlie the central portion of the fuel bed, above the central opening 11 of the ash pan, are supported by a blast distributor 13, here shown in the form of a series of superposed concentric blast hoods of well known form, beneath the edges of which the blast escapes laterally and radially into the fuel bed. The blast distributor 13 is adapted to be continuously rotated at a different speed from that of the ash pan 6, and to this end said blast distributor has its central portion suitably connected by radial webs 14 with a rotatable structure 15 that is supported upon an annular series of rollers 16. The structure 15, to which rotation is imparted at a different speed from that of the ash pan 6, provides an annular water chamber 17 for the reception of a circular flange 18 depending from said ash pan, whereby to provide a water seal between said independently rotatable parts.

The structure 15 constitutes, as will be seen, a conveying device for the ashes that are discharged through the opening 11 of the ash pan by the action of a plow 19, as indicated in Figs. 2 and 3. Said plow 19, as shown in Fig. 2, rests on the surface of the ash pan 6 and provides a plurality of arms or sweeps 20, adapted to rotate in a clockwise direction, and so curved that their movement will force the ashes inwardly toward the opening 11 when the plow is caused to travel faster than said ash pan 6. At their inner ends these arms or sweeps 20 have upwardly inclined portions 21, which

serve to raise the ashes over the flange 12, and to assist in this action, the plow may also be provided with additional inclined portions 22, 22, for the same purpose. In order to bring about rotation of the plow relative to the ash pan 6, said plow is provided with an inwardly directed projection 23, which stands in the path of a latch member 24 carried by the rotating blast distributor 13. The latch member 24 is adapted to be raised by a handle 25 when it is desired to move the plow 19 in unison with the blast distributor 13 and relatively to the ash pan 6, in order to render said plow operative; and said latch member 24 is adapted to be lowered by said handle 25 when it is desired to render said plow inoperative by rotation in unison with said ash pan, such rotation in unison taking place by reason of the pressure of the superposed fuel bed, tending to resist any relative movement between the plow and the ash pan.

The operation of the mechanism as thus far described is as follows:—The ash pan 6 is continuously rotated relative to the fuel containing shell by means of a pinion 26 that meshes with an annular gear 27 on the bottom of said ash pan, said pinion 26 being secured to a shaft 28 that is connected by gearing 29 with any suitable source of power, not shown. Rotation in the same direction, but at a higher speed, is continuously imparted to the blast distributor 13 by a pinion 30 in mesh with a gear 31 on the member 15, said pinion 30 being secured to a shaft 32 which is driven by a belt 33 from the shaft 28. The belt 33 engages oppositely arranged cone pulleys 34 and 35 on the shafts 28 and 32 respectively, thus constituting a variable speed drive between these shafts, which can be manipulated to secure a greater or less speed of rotation for the blast distributor 13.

Under these conditions, and assuming that the speed of the blast structure is in excess of the speed of the ash pan 6, the elevation of the latch member 24 will cause the plow 19, Fig. 2, to rotate in unison with the blast device, thus crowding the ashes inwardly toward the opening 11 of the ash pan. The inclined portions 21 and 22 of the plow constitute surfaces that cause the ashes to ride upwardly over the flange 12, and as a consequence, the ashes will drop by gravity through the opening 11 and through the annular passage provided by the member 15. Said member 15 has a downward extension 36 which directs the descending ashes into a receiver 37, the latter containing water into which the extension 36 dips, in order to provide a water seal. Said extension 36 carries a device 38 that rotates with reference to the bottom and sides of the receiver 37 for the purpose of effecting the final removal of ashes from the producer through a notch or opening 39 in the wall of the receiver.

It will readily be seen that the mechanism as above described with reference to Figs. 1 and 2, is adapted for either the continuous or the intermittent discharge of ashes from the shell 1. It will be seen that irrespective of whether such discharge be continuous or intermittent, the rate of discharge can be varied at will, simply by increasing or decreasing the amount by which the speed of the rotating blast structure exceeds the speed of the rotating ash pan. This can readily be accomplished by changing the position of the belt 33 on the pulleys 34 and 35.

It is also apparent that the mechanism as herein described is susceptible of a modified mode of operation that is predicated upon a greater speed being imparted to the ash pan than to the blast structure. Under these conditions, the plow must be constructed as shown at 40 in Fig. 3, with its blades or sweeps 20′ and 22′ having the opposite curvature from the sweeps 20 and 22 of Fig. 2. The operation of this mechanism, with the blast distributor revolving at a slower speed than the ash pan, partakes of all the possibilities hereinbefore described with reference to both the continuous and intermittent discharge of ashes, and in addition affords a definite advantage in that it tends to a more uniform cleavage of the ashes in the lower portion of the producer shell. This is because of the influence of the stationary shell with its depending apron 8 on the ashes near the outer periphery of the ash pan, it being clear that said shell has a retarding effect on the adjacent ash and fuel, which, unless counteracted, brings about a cleavage at too low a level in comparison to the cleavage above the blast distributor 13. When the ash pan is speeded up, as contemplated by the use of a plow such as shown in Fig. 3, this retarding tendency of the shell can be counteracted, and thus an approximately horizontal and uniform cleavage of ashes over the whole area of the producer can be obtained. Under either of the above conditions of operation of the structure shown in Fig. 1, it is preferable to make the edge of the apron 8 serrated, as shown at 41, Fig. 4, thereby eliminating, to some extent, the tendency of the ash to become packed in the space between said edge and the bottom of the ash pan.

I claim:

1. In a gas producer, a rotating ash support, an ash removal means operable over the surface thereof, a rotating blast distributor, and means for procuring movement of said ash removal means either in unison with said support or in unison with said distributor.

2. In a gas producer, the combination with an ash support and a blast distributor,

of means for rotating both of said parts, and an ash plow responsive to relative movement between said parts for procuring the discharge of ashes from said support.

3. In a gas producer, the combination with an ash support and a blast distributor, of means for rotating both of said parts, an ash removal means operable over the surface of said support, and means operable by said blast distributor to cause rotation of said ash removal means at a different speed from that of said support.

4. In a gas producer, the combination with an ash support and a blast distributor, of means for rotating said parts independently, means for varying the speed of one of said parts, and an ash plow operable over said support and responsive to such variation for controlling the discharge of ashes from the producer.

5. In a gas producer, the combination with an ash support and a blast distributor, of means selectively operable to procure rotation of said parts at different speeds, and an ash removal means rendered operative by rotation of said parts at different speeds.

6. In a gas producer, an ash support, means for causing relative movement between said support and the bed of ash and fuel superposed thereon, and plowing means for procuring the inward movement of ashes toward the center of said support.

7. In a gas producer, an ash support, means for causing relative movement between said support and the producer shell, and means movable relatively both to said ash support and to said shell for procuring the discharge of ashes at the center of said support.

8. In a gas producer, an ash support, means for causing relative movement between said support and the producer shell, a central blast distributor, and means operable by relative movement between said distributor and said ash support for effecting the discharge of ashes from the center of said support.

9. In a gas producer, an ash support, means for causing relative movement between said support and the producer shell, a central blast distributor, and means operable by relative movement between said support and said distributor for crowding ashes inwardly on said support toward the space beneath said distributor.

10. In a gas producer, an ash support having an opening in its bottom, means for causing relative movement between said support and the producer shell, a blast distributor in superposed relation to the opening in said support, and means controlled by the movement of said blast distributor for procuring the discharge of ashes through said opening.

11. In a gas producer, a fuel shell, an annular supporting means at the bottom of said shell, a centrally disposed ash supporting means within said shell, and means for causing the inward discharge of ashes from said first named supporting means by relative rotation between said two supporting means.

12. In a gas producer, a rotating ash support, a rotating blast distributor, and means responsive to relative rotation between said parts for procuring the movement of ashes inwardly on said support.

13. In a gas producer, a rotating ash support, a rotating blast distributor, and means responsive to relative rotation between said parts for procuring the discharge of ashes from the producer at the center of said support.

14. In a gas producer, a rotating ash support, a rotating blast distributor, and plowing means responsive to relative rotation between said parts for procuring movement of ashes inwardly on said support, for discharge from the producer below said blast distributor.

15. In a gas producer, an ash support and a blast distributor, means for rotating one of said parts at a higher speed than the other, and means responsive to such difference in speed for causing discharge of ashes from the producer at the center thereof.

16. In a gas producer, an ash support and a blast distributor, means for rotating said ash support at a higher speed than said blast distributor, and means responsive to such difference in rotation for causing discharge of ashes from the producer at the center thereof.

17. In a gas producer, the combination with a shell, of an ash support disposed centrally thereof, an annular support for ashes between said central support and said shell, and means for rotating said annular support at a higher speed than said central support.

18. In a gas producer, the combination with a shell, of an ash support disposed centrally thereof, an annular support for ashes between said central support and said shell, and means for rotating said supports relative to said shell in the same direction at different rates of speed.

19. In a gas producer, the combination with a shell, of an ash support disposed centrally thereof, an annular support for ashes between said central support and said shell, means for rotating both of said supports, and means operable by a difference in rotative speeds between said supports for procuring the discharge of ashes directly below said central support.

20. In a gas producer, the combination with a shell, of an ash support disposed centrally thereof, a second support for ashes between said central support and said shell, means for rotating both of said supports,

and means rotatable in unison with one of said supports for procuring the discharge of ashes from the other of said supports.

21. In a gas producer, the combination with a fuel containing shell, of an ash support, means for causing relative movement between said ash support and said shell, an ash removal means operable over the surface of said support, a rotating blast distributor, and means for procuring movement of said ash removal means either in unison with said support or in unison with said distributor.

Dated this 9th day of March, 1920.

CHARLES W. LUMMIS.