No. 886,484. PATENTED MAY 5, 1908.

V. E. EDWARDS.

FEEDING MECHANISM FOR GAS PRODUCERS.

APPLICATION FILED SEPT. 30, 1904.

3 SHEETS—SHEET 1.

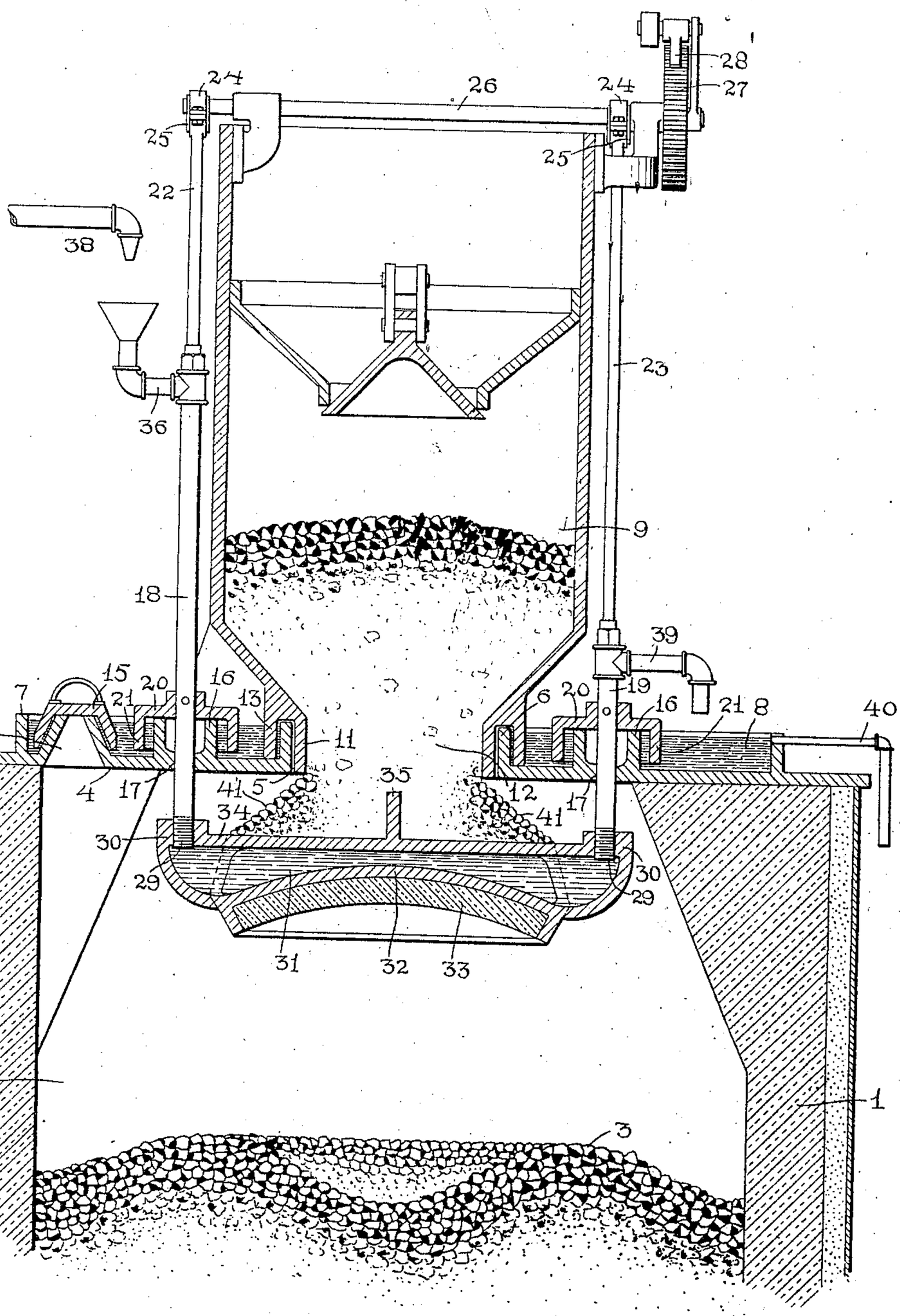

Fig. 1.

Witnesses

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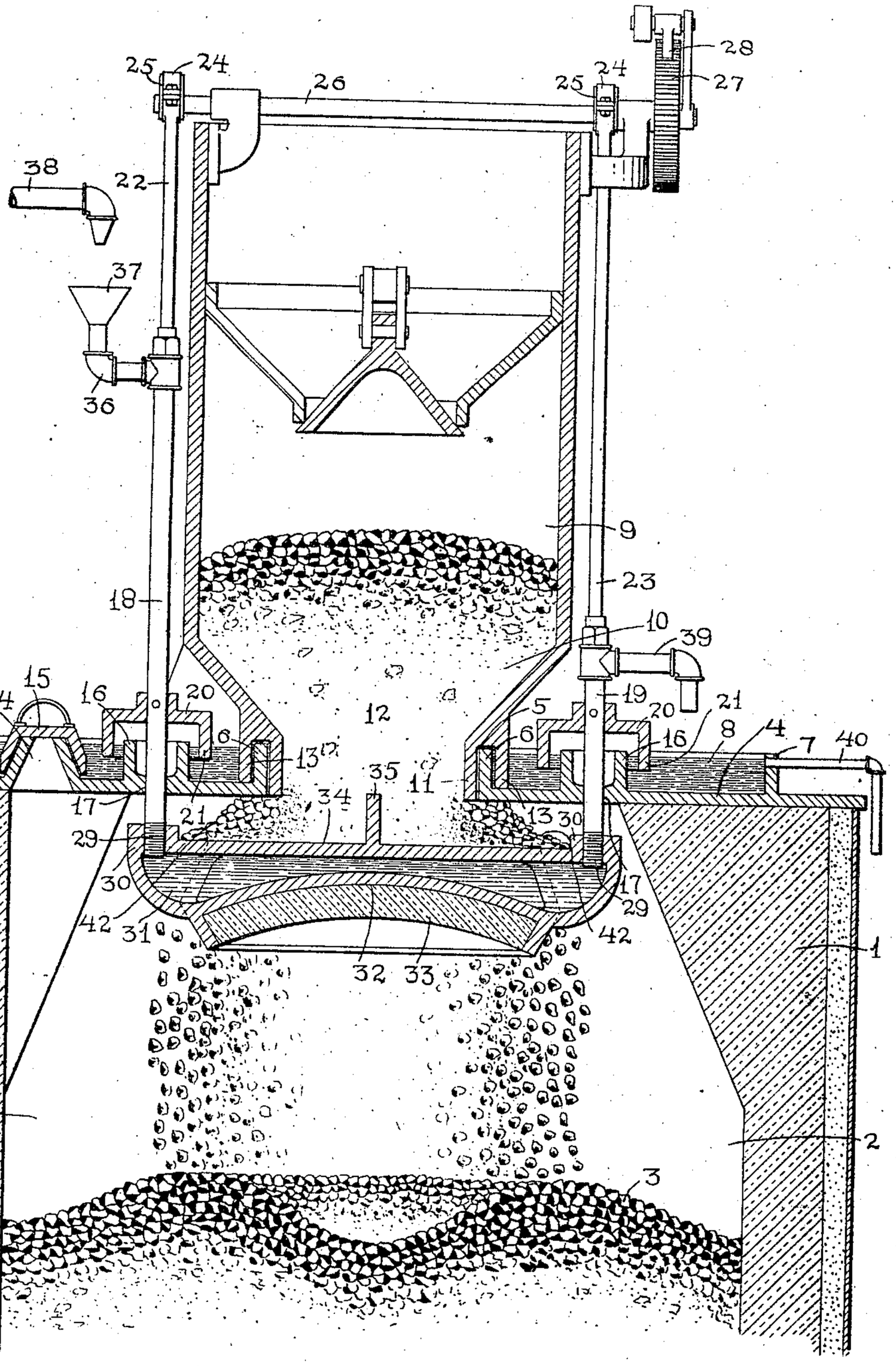

Witnesses

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Fig. 2.

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3 SHEETS—SHEET 3.

Fig. 3.

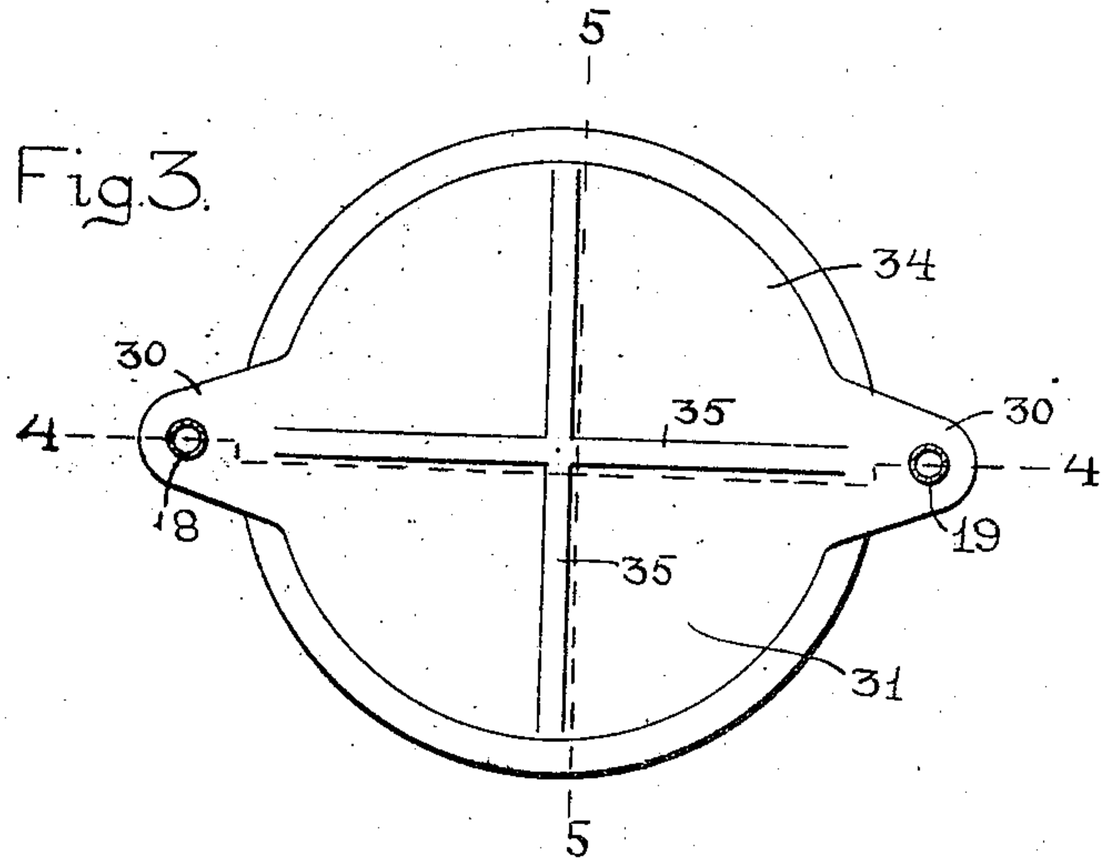


Fig. 4.

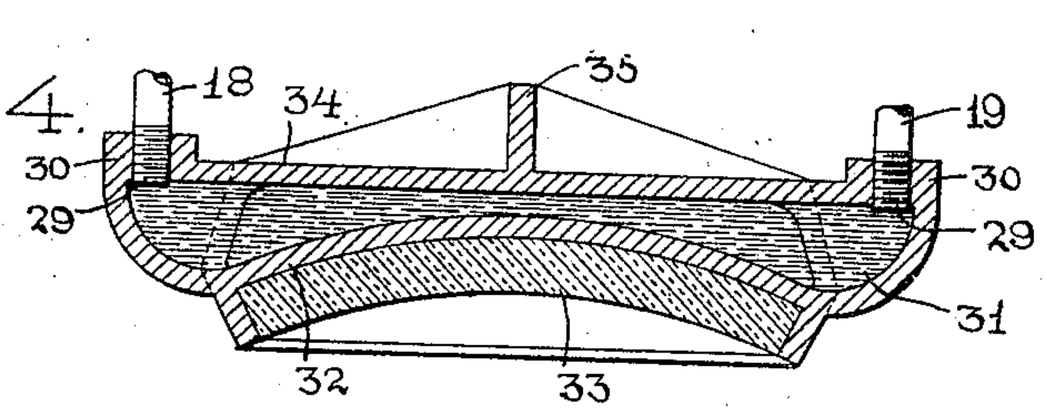


Fig. 5.

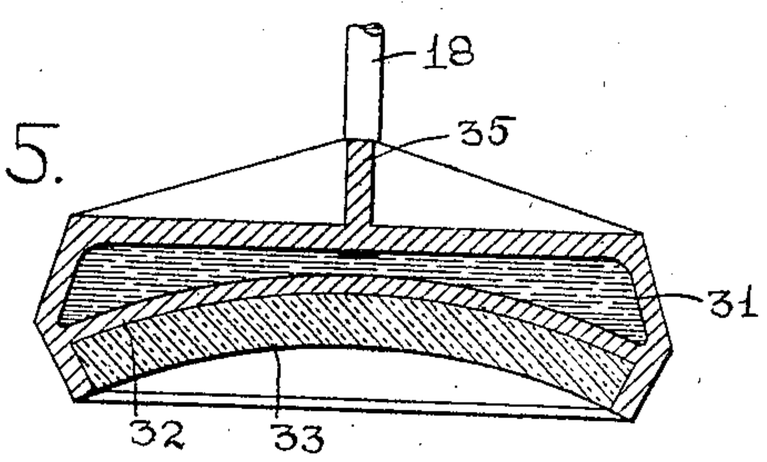
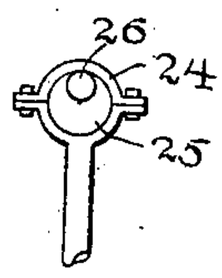


Fig. 6.



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UNITED STATES PATENT OFFICE.

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FEEDING MECHANISM FOR GAS-PRODUCERS.

No. 886,484. Specification of Letters Patent. Patented May 5, 1908.

Application filed September 30, 1904. Serial No. 226,606.

To all whom it may concern:

Be it known that I, VICTOR E. EDWARDS, 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 Feeding Mechanism for Gas-Producers, of which the following is a specification, accompanied by drawings forming a part of the same, in which—

Figure 1 represents a vertical, sectional view of the upper part of a gas producer having a feeding mechanism embodying my invention. Fig. 2 is a central, vertical, sectional view, similar to that shown in Fig. 1 but having the coal supporting shell raised to its highest position in the operation of delivering coal to the gas producing chamber. Fig. 3 is a detached, top view of the coal supporting shell. Fig. 4 is a vertical, sectional view of the coal supporting shell on line 4,—4, Fig. 3. Fig. 5 is a vertical, sectional view of the coal supporting shell on line 5,—5, Fig. 3. Fig. 6 is an end view of one of the actuating eccentrics by which the coal supporting shell is raised and lowered.

Similar reference letters and figures refer to similar parts in the different views.

My present invention relates to the feeding mechanism for feeding coal to the heating chamber of a gas producer, and it has for its objects to provide a feeding mechanism capable of withstanding the excessive heat of the heating chamber and by which the coal may be distributed evenly and uniformly to the heating chamber and it consists in the construction and arrangement of parts as hereinafter described and set forth in the annexed claims.

Referring to the accompanying drawings, 1 denotes the side walls of a gas producer, 2 the heating chamber, and 3 the coal contained therein. The heating chamber 2 is open at the top and is covered by a metal top plate 4 having a central opening 5, which is surrounded by an upturned flange 6. The top plate 4 is provided with a similar upturned flange 7 concentric with the flange 6 with the inclosed space 8 between the flanges 6 and 7 forming an annular water space. Supported upon the cover 4 is a coal reservoir 9 having a hopper-shaped bottom 10, provided with a circular flange 11, which is inserted within the opening 5 of the top plate 4, and incloses a delivery opening 12 through which coal is delivered from the reservoir 9 into the heating chamber. The reservoir 9 is provided with a depending annular flange 13 which surrounds the flange 6 of the top plate 4 and enters the water space 8 thereby water sealing the lower end of the coal reservoir. The cover 4 is also provided with one or more openings, one of which is shown at 14, closed by the water sealed cover 15, and affording means for examining the interior of the heating chamber or for the admission of a poker. The top plate 4 is also provided on diametrically opposite sides of the delivery opening 12 with upturned, circular flanges 16, 16 which extend upward through the water space 8 and inclose openings 17, 17 to receive the pipes 18, 19.

Attached to the pipes 18, 19 and above the flanges 16, 16 are disks 20, 20 provided at their outer edges with depending flanges 21 which extend into the water space 8 thereby water sealing the openings 17, 17. Rigidly attached to the upper ends of the pipes 18, 19 are eccentric rods 22, and 23 which are connected at their upper ends to eccentric straps 24 carried on eccentrics 25, 25 attached to a rotating shaft 26 which is actuated by any suitable means, such for example as a ratchet wheel 27 and reciprocating pawl 28. The lower ends of the pipes 18, 19 are screw threaded at 29, 29 and are attached to radially projecting ears 30 on a coal receiving shell 31 which is suspended by the pipes 18 and 19 directly beneath the delivery opening 12 of the coal reservoir and concentrically with the heating chamber 2 of the gas producer. The under side of the coal receiving shell 31 is concave, as shown at 32, Figs. 1 and 2, and the concave side is lined with some suitable refractory material 33 such as fire clay or asbestos.

The upper surface 34 of the coal receiving shell 31 is a plane horizontal surface provided with ribs 35, preferably four in number and triangular in shape and extending from the center of the surface 34 to its periphery, said ribs being the highest in the center and gradually decreasing in height to the periphery of the surface 34. The water pipes 18

and 19 communicate at their lower ends with the interior of the shell 31, and the pipe 18 is provided at its upper end with a branch pipe 36 through which a water supply is provided for the shell 31 in any suitable manner, in the present instance by means of a funnel 37 and a pipe 38, connected with a suitable water supply and arranged to deliver water to the funnel 37. The upper end of the pipe 19 is provided with a branch pipe 39 at a lower point than the branch pipe 36 and arranged to deliver the overflow water from the shell 31 into the water space 8 within which the water is maintained at a constant level by means of an overflow pipe 40. When the coal receiving shell 31 is in its lowest position as shown in Fig. 1 the coal contained in the reservoir 9 falling through the delivery opening 12 will be received upon the surface 34. The mass of coal spreading at the base will assume a form as indicated by the coal lines 41, 41, Fig. 1, said coal lines indicating the angle of repose within which the coal will be supported in a state of rest upon the coal supporting surface 34. The diameter of the coal supporting surface 34 is therefore considerably greater than the diameter of the opening 12 to enable the coal to be supported thereon in a state of rest when the shell 31 is in its lowest position. If shafts 26 and eccentrics 25 be rotated one half a revolution shell 31 will be raised from the position shown in Fig. 1 to that shown in Fig. 2 causing the mass of coal between the lower end of the coal reservoir and the surface 34 to be vertically compressed, thereby causing an expansion of the base of the mass of coal as indicated by the coal lines 42, 42, Fig. 2, and thereby pushing the base of the coal beyond the periphery of the circular coal supporting surface 34 so that a portion of the coal will fall over the circular edge 43 of the shell 31 into the heating chamber 2, as represented in Fig. 2. The continued rotation of the shaft 26 will cause the feeding operation to be repeated and the up and down movement of the ribs 35 will serve to disintegrate the mass of coal and facilitate its distribution over the edge of the coal supporting surface 34. The ribs 35 also serve to strengthen the shell 31 and resists any tendency to warp due to the excessive heat of the gas producing chamber. The shell 31 is also further protected from the injurious effects of excessive heat by means of the lining 33 and also by the continued current of water which is maintained through the pipes 18 and 19 and interior of the shell.

It is desirable in gas producers to feed the coal uniformly to the heating chamber and also to secure a uniform distribution of the coal within the chamber in order that the gas produced may be uniform in quality and amount and the mechanism employed to secure the uniform feeding of coal must be simple in construction and either adequately protected from the injurious effects of the excessive heat of the gas producing chamber, or be rendered capable of withstanding it. That part of the mechanism concerned in the distribution of the coal should be located in close proximity to the bed of fuel within the gas producing chamber, consequently within the hottest zone of the chamber. Any movable mechanism requiring accuracy of construction such as the journal bearings of rotating shafts is liable to be soon impaired by the warping effects caused by the excessive heat.

By my improved feeding mechanism I secure a uniform distribution of the coal over the circular edge of the coal supporting surface 34, and I prevent the distortion of this circular edge by maintaining a current of water beneath the surface 34. I am thereby enabled to place the coal distributing member of my improved feeding mechanism wholly within the heating chamber 2, and to bring it within the required proximity to the bed of fuel 3. I avoid the use of rotating shafts within the heating chamber and secure the requisite movement of the shell 31 to accomplish the distribution of coal by means of long connections passing through the water sealed opening 17 to the actuating eccentrics mounted upon the shaft at the top of the coal reservoir and removed from the injurious effects of heat. The peculiar movement given to the coal distribution shell 31 serves to effectually disintegrate the mass of coal and to break up any aggregations produced by coking of the coal and thereby producing uniform feeding of the coal of normal size and preventing the clogging of the coal passage from the reservoir 9 to the heating chamber.

The coal supporting surface is shown in the accompanying drawings as circular and concentric with the fuel admission opening to the heating chamber. I do not wish, however, to confine myself to the use of a circular opening for the admission of fuel, or to the use of a circular coal supporting surface, as it is only necessary that the two be similar in outline; that is, if the coal admission opening were to be made square, the coal supporting surface would be square, or if the admission opening were hexagonal, the coal supporting surface would be hexagonal, and the coal supporting surface should be held concentrically with the heating chamber.

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

1. In a gas producer, the combination with a gas producing chamber provided with an opening in its top for the admission of coal, and a coal reservoir above said opening, of a water tight shell supported beneath said opening and within the gas producing cham-

ber, hollow supports for said shell, said shell having a coal supporting surface for receiving coal fed through said opening, and means for supplying a current of water to said shell through said hollow supports.

2. In a gas producer, the combination with a gas producing chamber, and a cover for said chamber provided with an opening for the admission of coal to the chamber, of flanges on the upper side of said cover inclosing an annular water space around said opening, a coal reservoir having its lower end water sealed in said annular water space, a water tight shell supported beneath said opening and within said gas producing chamber, and having a coal supporting surface, hollow supports for said shell, means for admitting water through one of said hollow supports to one side of said shell, and an outlet through another of said hollow supports emptying into said annular water space.

3. In a gas producer, the combination with a heating chamber, a cover for said chamber provided with an opening for the admission of coal to said chamber, of a hollow shell beneath said opening having a coal supporting surface, hollow supports for said shell, means for imparting a vertical reciprocating movement to said supports, and means for supplying a current of water to said shell through said supports.

4. In a gas producer, the combination with a gas producing chamber having an opening in its top for the admission of coal, of a coal supporting shell placed beneath said opening, radial ears on the edge of said coal supporting shell, suspension pipes connected with said ears and communicating with said shell, and means for maintaining a water current through said pipes and said shell.

5. In a gas producer, the combination with a gas producing chamber having an opening in its top for the admission of coal, of a shell supported beneath said opening, said shell having a concave under side and a plane upper surface for the reception of coal, a refractory lining for said concave under side, and means for supplying water to the interior of said shell.

6. In a gas producer, the combination with a heating chamber, a cover for said chamber provided with an opening for the admission of coal to said chamber, of a shaft journaled above said cover, a hollow shell provided with a coal supporting chamber suspended below said cover, intermediate mechanism between said shaft and said shell, whereby said shell may be vertically reciprocated and means for supplying said shell with a current of water.

7. In a gas producer, the combination with a heating chamber having an opening in its top for the admission of coal, of a coal supporting surface beneath said opening, and means for imparting a continuous vertically reciprocating motion to said surface, whereby the coal is distributed in said chamber over the edge of said coal supporting surface.

8. In a gas producer, the combination with a heating chamber having an opening in its top for the admission of coal, to said chamber, a continuously rotating shaft journaled above said chamber, a coal supporting surface beneath said opening, and intermediate mechanism between said shaft and said coal supporting surface, whereby said surface receives a vertically reciprocating movement by the rotation of the shaft.

9. In a gas producer, the combination with a heating chamber provided with an opening in its top for the admission of coal, a continuously rotating shaft journaled above said chamber, eccentrics rotated by said shaft, a coal supporting surface beneath said opening, and connecting means between said coal supporting surface and said eccentrics, whereby a continuous vertically reciprocating movement is imparted to said coal supporting surface.

10. In a gas producer, the combination with a heating chamber provided with an opening in its top for the admission of coal, of a coal supporting surface beneath said opening, and means for continuously and rapidly raising and lowering said surface through parallel planes.

11. In a gas producer, the combination with a heating chamber provided with an opening in its top for the admission of coal, of a non rotatable coal supporting surface beneath said opening, and means acting continuously for raising said surface to distribute the coal throughout the heating chamber over the edge of said coal supporting surface, and for lowering said surface to receive a fresh supply of coal through the admission opening.

12. In a gas producer, the combination with a heating chamber, of a top plate, or cover, provided with an opening for the admission of coal to said heating chamber, a shaft journaled above said top plate or cover, eccentrics carried by said shaft, eccentric links, a coal supporting surface suspended from said links, openings in said top plate or cover for said links, a water space surrounding said openings and means for water sealing said openings.

13. In a gas producer, the combination with a heating chamber, provided with an opening in its top for the admission of coal to the chamber, of a shell provided with coal supporting surface and placed beneath said opening, rotating eccentrics journaled above said opening, links connecting said eccentrics and said shell, said links comprising a section of pipe, communicating with said shell and forming part of a water circulatory system, whereby a current of water is maintained through said shell.

14. In a gas producer, the combination with a heating chamber provided with an opening in its top for the admission of coal, a coal supporting surface beneath said opening, supports for said surface attached to its periphery, and means acting continuously to vertically reciprocate said supports in the same direction at the same time.

15. In a gas producer, the combination with a heating chamber provided with an opening in its top for the admission of coal, of a non rotatable coal supporting surface beneath said opening, and means acting continuously for alternately increasing and diminishing the distance between said surface and said admission opening.

Dated this 26th day of Sept. 1904.

VICTOR E. EDWARDS.

Witnesses:

PENELOPE COMBERBACH,

RUFUS B. FOWLER.