

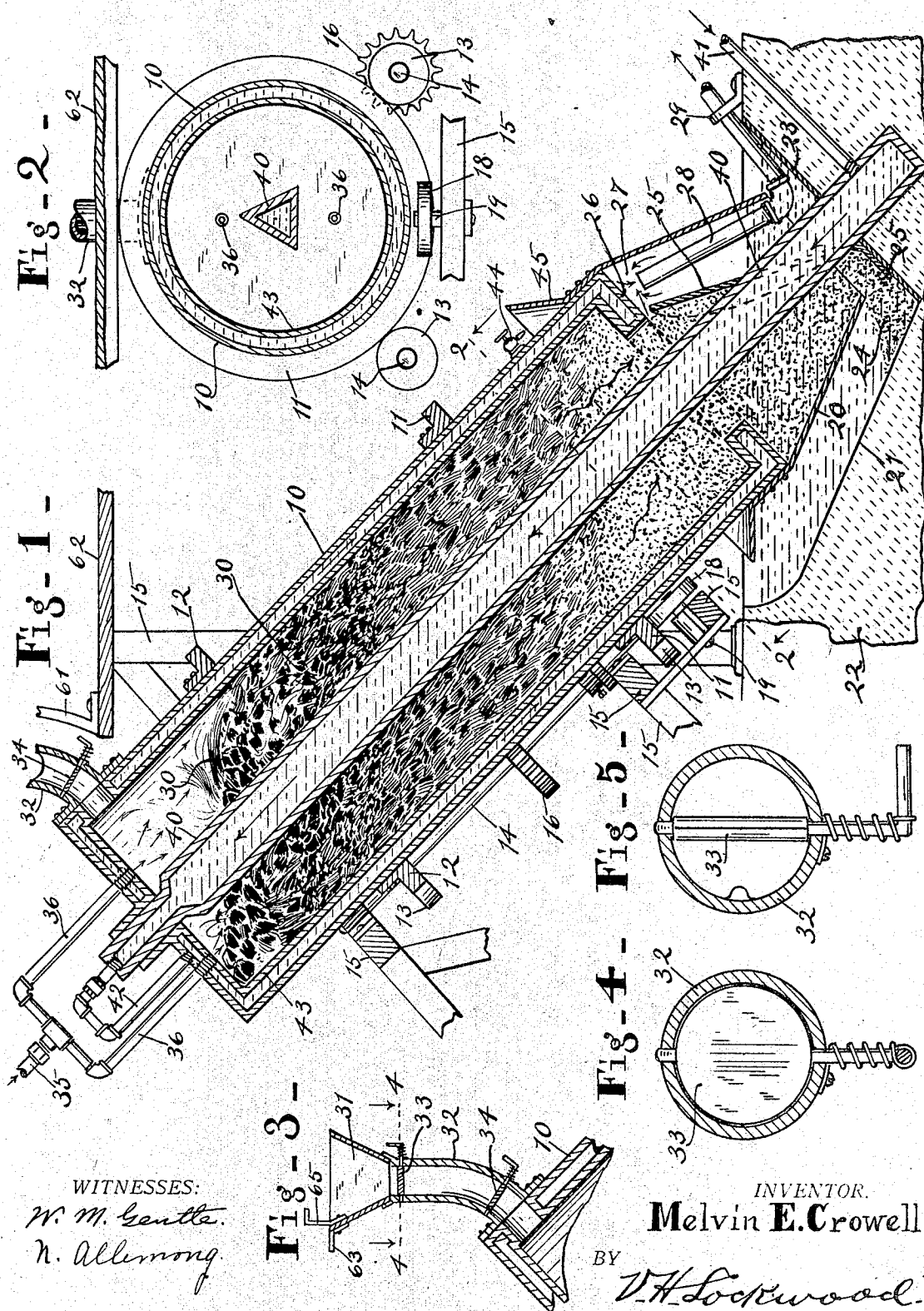
No. 894,877.

PATENTED AUG. 4, 1908.

M. E. CROWELL.
GAS PRODUCER.

APPLICATION FILED JAN. 14, 1907. RENEWED DEC. 16, 1907.

3 SHEETS—SHEET 1.



WITNESSES:

W. M. Gentle.

N. Allmoning.

Fig-3-

Fig-4- Fig-5-

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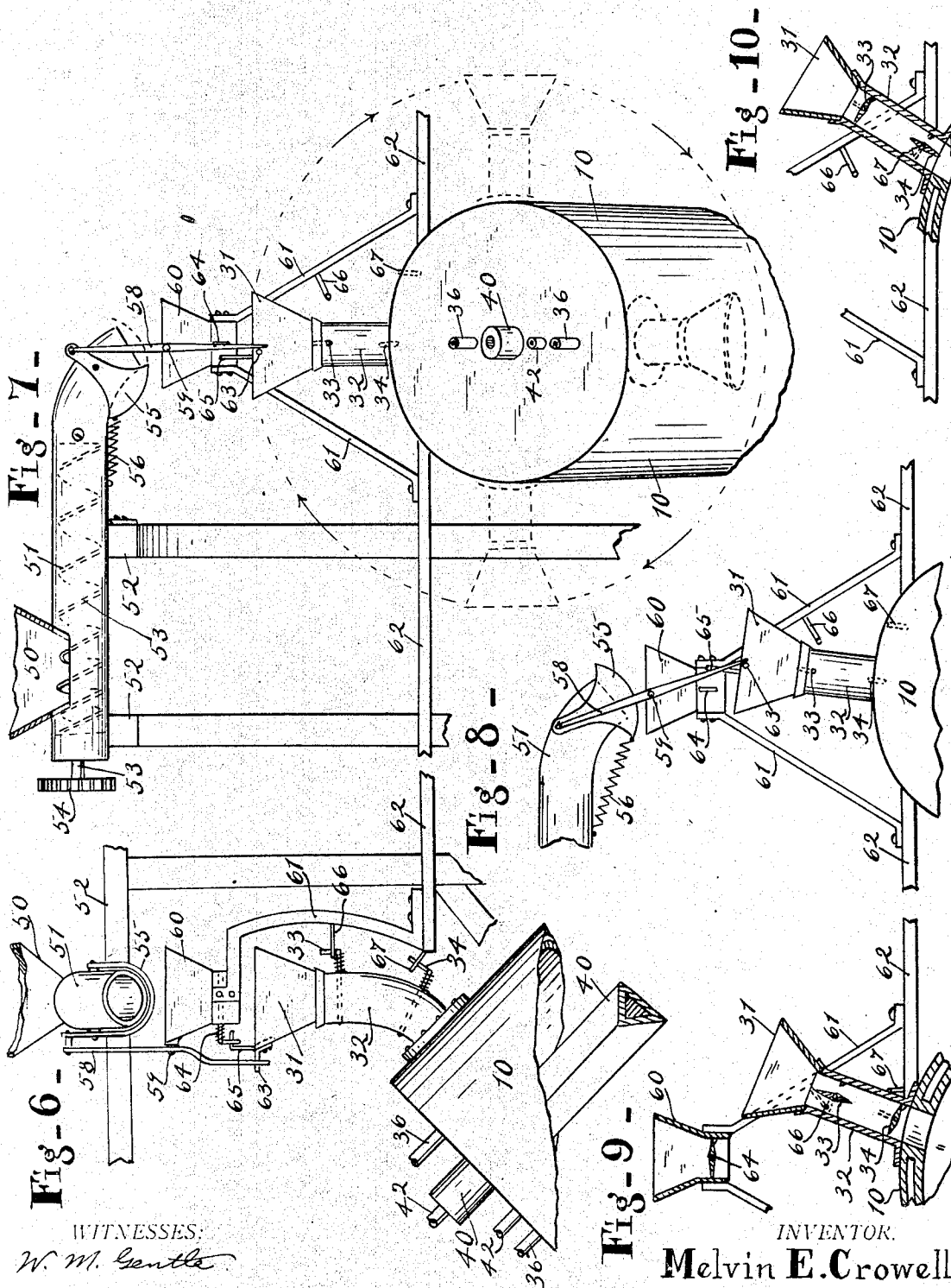
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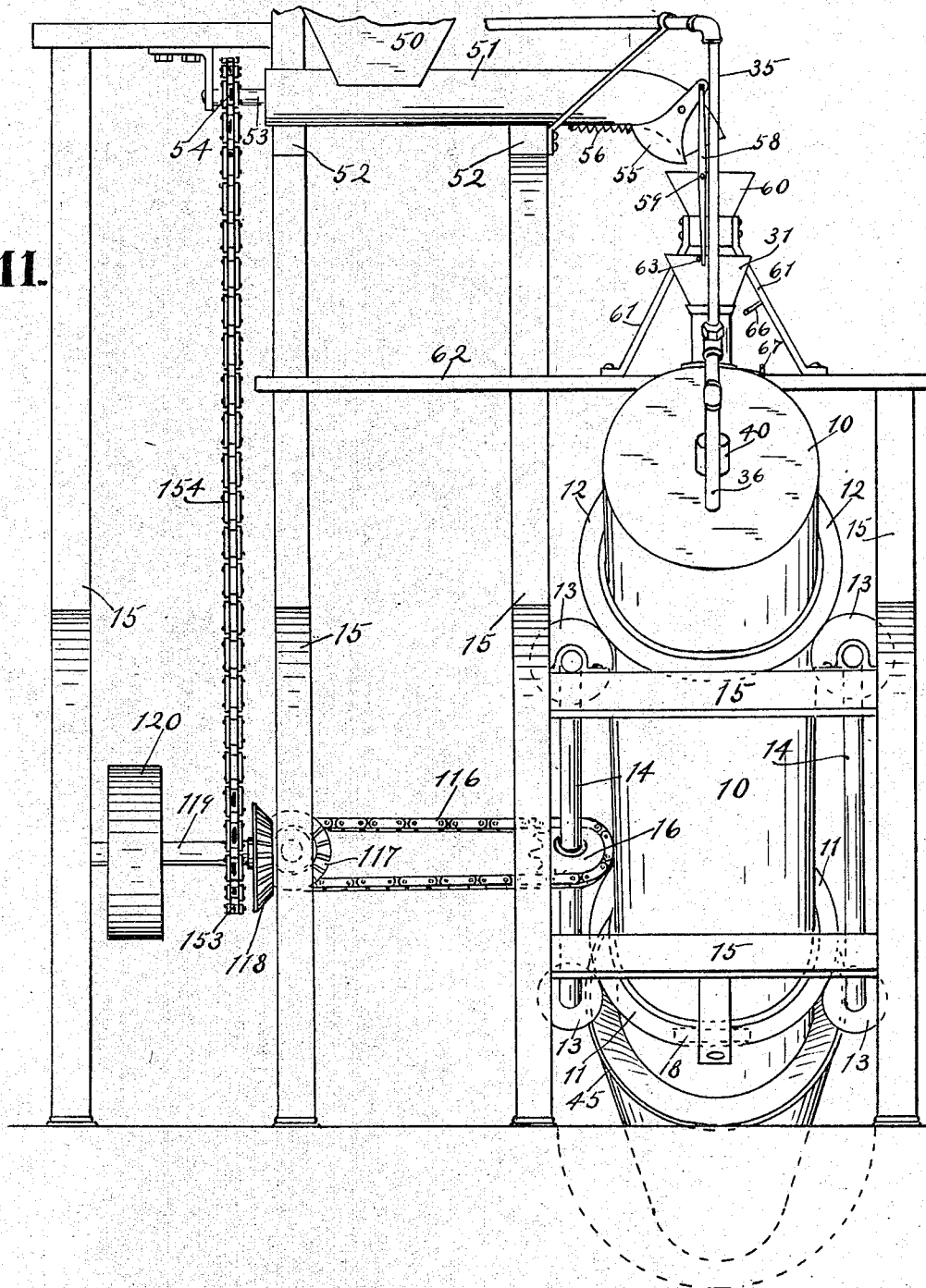
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3 SHEETS—SHEET 3.

Fig. 11.



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UNITED STATES PATENT OFFICE.

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GAS-PRODUCER.

No. 894,877.

Specification of Letters Patent.

Patented Aug. 4, 1908.

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To all whom it may concern:

Be it known that I, MELVIN E. CROWELL, of Franklin, county of Johnson, and State of Indiana, have invented a certain new and useful Gas-Producer; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, in which like letters refer to like parts.

The object of this invention is to improve the construction and operation of gas producers and means for stirring the coal and means for charging the producer with coal.

To that end one feature of the invention consists in arranging the producer shell in an inclined position and providing means for constantly revolving it, with a stirrer or coal agitator extending centrally into the shell and which resists the revolving movement of the coal in the shell, and in that way the coal is kept from clinking.

The producer shell is provided with a water-jacket and water is supplied to the upper end thereof through the centrally extending stirrer which is hollow and through which the water is passed at first and while it is coolest. The water passes into the lower end of the hollow stirrer, through it and out at its upper end into the upper end of the water-jacket of the producer shell and downwardly through said water-jacket to a discharge-cock. The lower end of the producer shell extends into a water filled ash-pit whereby the lower end of the shell is water sealed.

Another feature consists in an improvement in the coal feed that prevents the admission of air into the producer shell while the coal is feeding in. Also in force feeding the coal by means of the same driver that causes the revolutions of the shell, whereby there is maintained a relativity between the operations of the coal supply and gas production.

The nature of the invention will be more fully understood from the accompanying drawings and the following description and claims.

In the drawings, Figure 1 is a central vertical section through the gas producer and a portion of the means for mounting the same, parts being broken away. Fig. 2 is a section on the line 2-2 of Fig. 1. Fig. 3 is a vertical section through the hopper and upper corner of the producer shell, when the hopper is in its upward position. Fig. 4 is a

section on the line 4-4 of Fig. 3, showing the damper closed. Fig. 5 is the same showing the damper open. Fig. 6 is a side elevation of the coal charging means and the hopper and upper end of the producer shell when the latter is turned with the hopper upward, parts being broken away. Fig. 7 is a front elevation of the same, with the path of the hopper and its various positions being shown by dotted lines. Fig. 8 shows a portion of the same that appears in Fig. 7 with the means operated for closing the discharge of coal into the stationary hopper while it is discharging into the hopper on the producer shell. Fig. 9 shows parts of the same in their positions after the upper damper in connection with the revolving hopper has been opened. Fig. 10 is the same showing the parts in their positions when the lower damper is open. Fig. 11 is a front elevation of the entire apparatus.

In detail there appears in the drawings forming a part of this patent a gas producer shell 10 mounted in an inclined position, at an angle of about 45 degrees from a vertical line and its length being preferably greater than its diameter. It is revolvably mounted, as it has a pair of annular collars 11 and 12 secured to it that have peripheral frictional surfaces which are engaged by friction wheels 13 secured on shafts 14 mounted parallel with the shell and mounted and having bearings in the frame 15. One of said shafts 14 has a sprocket-wheel 16 mounted on it to which a chain 116 runs from the bevel-gear 117 that meshes with the bevel-gear 118 on the shaft 119 that is driven by the pulley 120.

The producer shell is held in its upward position by the roller 18 on the spindle 19 that is mounted in the frame-work 15, said roller 18 peripherally engaging the lower surface of the collar 11 as appears in Figs. 1 and 2. If one roller 18 and spindle 19 are not strong enough to support said shell and its contents, the number may be increased. Said means supports said shell so that the lower conical end 20 thereof projects into the ash-pit 21 formed in the concrete base 22, as appears in Fig. 1. One side of said ash-pit is lined with a metal plate 23 opposite said conical lower end 20 and there is sufficient space between said metal plate 23 and the lowering end of the said cone 20 to permit the discharge of the ashes 24 from said cone 20 into the pit. A plate 25 is secured at its lower

end to the plate 23 in the ash-pit and projects upwardly into said cone 20 to a point above the axis of said shell and almost to the inwardly extending annular flange or contracted portion 26 of said shell, for the purpose of deflecting and crowding the ashes downward into the ash-pit and keeping the ashes out of the chamber 27 into which the gas outlet pipe 28 projects. There is sufficient space between the upper end of the plate 25 and the contracted lower end 26 of the shell for the escape of gas from the shell into the chamber 27 whence it is withdrawn through the pipe 28. The pipe 28 is held stationary by the clamp 29 that is secured to the concrete 22.

Coal 30 is introduced into the hopper 31 that is connected by a pipe 32 with the upper end of the shell 10 and therefore said hopper revolves with the shell. Said pipe 32 has in it two dampers 33 and 34 that are held closed by springs and are opened by means hereafter explained. Steam and air mixed are introduced into said producer shell through the pipe 35 and branch pipes 36 that enter the upper end of said shell and revolve therewith.

A hollow stirring device 40 extends centrally and longitudinally through the shell 10 and is stationary. Its lower end is embedded in the concrete 22 and it is shown herein triangular in cross section. Water is forced into it through the pipe 41 from some suitable source of water supply and thereby said stirrer is kept cool. The angular form of said stirrer, during the revolutions of the producer shell, resists the revolving movement of the coal, and in combination with the shifting of the coal during the revolutions of the inclined producer shell the coal is kept thoroughly agitated and mixed and clinking and clogging are prevented.

The water issues from the upper end of the stirrer 40 through a pipe 42 into the upper end of the water-jacket 43 in said producer shell, there being a loose pipe connection between the parts 40 and 42 so that the shell may revolve and the agitator remain stationary. This jacket extends all about said shell and the water therein from said stirrer accumulates and fills said jacket and keeps the shell cool and issues from the cock 44 into an annular trough 45 secured to the shell and from that trough it flows into the ash-pit 21 and fills it to the desired level and flows up into the conical lower end 25 of the shell and thus forms an effectual water seal for the ash discharge end of the shell. This water cooling means supplies the water while coolest to the stirrer which is in the hottest position and also supplies the water-jacket.

The means for automatically feeding coal to the producer shell as it revolves will now be explained. Coal from some suitable source of supply is in the first place loaded

into the stationary bin 50, seen in Figs. 6 and 7, from which it empties by gravity into the feed tube 51 and then is conveyed by a screw 53, shown in dotted lines, that is driven by a gear 54. The discharge end of the tube 51 is turned downward somewhat and has a hood 55 with an arm extending upward therefrom on each side of the tube 51 and fulcrumed to said tube. The hood is held normally out of position for closing the outlet end of said tube by a spring 56 and is moved into a closing position by a lever 58 fulcrumed at 59 on the stationary hopper 60 below. This latter hopper is supported by bars 61 extending up from the plate 62 of the frame of the apparatus. The lever 58 is actuated by a pin 63 on the hopper 31 that revolves with the producer shell. A spring closed damper 64 is mounted in the hopper 60 that is opened by the arm 65 extending up from the revolving hopper 31. An arm 66 from one of the bars 61 actuates the spring-closed damper 33 and the arm 67 from the plate 62 actuates the spring-closed damper 34. The screw 53 is driven by the same means that revolves the producer shell 10, through the sprocket-wheel 153 on the shaft 119, chain 154 and sprocket-wheel 54 on the screw 53.

The operation of the coal feeding mechanism is as follows: The coal deposited in the bin 50 is fed mechanically from under the bin by the screw 53 through the tube 51 into the stationary hopper 60. As the shell 10 revolves the pin 63 on the hopper 31 actuates the lever 58 and closes the hood 55 by moving it from the position shown in Fig. 7 to that shown in Fig. 8. The hood when closed prevents any coal issuing from the tube 51 while the coal in the hopper 60 is being discharged into the hopper 31, so that the incoming coal into the hopper 60 will not prevent the damper 64 being closed. About the time the mechanism begins to close the hood 55, the arm 65 on the revoluble hopper 31 opens the damper 64 and permits all the coal to be discharged from the hopper 60. By the time all the coal is out of the hopper 60 the hood 55 is closed so that the hopper 60 will be entirely empty and the damper 64 can be closed before the lever 58 is released by the further movement of the hopper 31; then the hood 55 moves back to its position shown in Fig. 7 and permits the hopper 60 to be again filled. The further movement of the hopper 31 will cause the damper 33 to be opened by the arm 66 and the coal will pass into the tube 32. After the damper 33 is closed the arm 67 will open the lower damper and let the coal pass into the shell 10. The two dampers 33 and 34 are for the purpose of excluding the air from the shell 10 during the feeding of the coal. With this coal feeding apparatus the rate of charging will vary as the speed of the shell varies in rotation and as the production of gas varies, as a single

means drives the screw 53 in the tube 51 and the revolving shell 10.

While a cylindrical shell is herein shown, and a stirrer triangular in cross section, I do not wish to be limited to either of said forms as they might be rectangular or otherwise formed so as to be irregular in cross section without deviating from the principle of my invention. Nor do I wish to be limited to a water jacketed shell, as it might be otherwise protected.

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

1. A gas producer including a revoluble shell for the coal, and a stationary stirrer extending longitudinally through said shell.

2. A gas producer including a revoluble shell for the coal mounted in an inclined position, and a stirrer extending into said shell and arranged to resist the revolving movement of the coal in the shell, whereby the stirrer and the gravity of the coal in the shell will keep the coal broken up and mixed.

3. A gas producer including a revoluble shell for the coal that is mounted in an inclined position, and a stationary stirrer projecting into said shell.

4. A gas producer including a revoluble shell for the coal mounted in an inclined position, and a stirrer projecting centrally through the lower end into said shell, said stirrer being rigidly secured at its lower end.

5. A gas producer including a base with an ash-pit formed therein, a revoluble shell for the coal mounted in an inclined position with its lower end extending into said ash-pit, and a stirrer projecting centrally through the lower end of said shell into the same, the lower end of said stirrer being embedded and secured in said base.

6. A gas producer including a revoluble shell for the coal mounted in an inclined position with an ash outlet at its lower end, means for water sealing said ash outlet end of said shell and a stationary stirrer extending longitudinally into said shell.

7. A gas producer including a revoluble shell for the coal mounted in an inclined position with a conical lower end having an ash outlet opening, a base with an ash-pit therein into which conical end of the shell projects and discharges, means for water sealing the outlet end of said shell, and a stirrer projecting centrally through said conical lower end of the shell into the shell and rigidly secured at its lower end to said base.

8. A gas producer including a revoluble shell for the coal mounted in an inclined position with a conical open lower end and contracted at the upper end of said conical portion, an ash-pit into which said conical lower end extends, means for water sealing said conical lower end, and a stationary plate projecting into said conical lower end of the shell to a point near the contracted portion of the

shell so as to leave a gas outlet between said plate and the contracted portion of the shell, substantially as set forth.

9. A gas producer including a revoluble shell for the coal mounted in an inclined position with a conical open lower end and contracted at the upper end of said conical portion, an ash-pit into which said conical lower end extends, means for water sealing said conical lower end, a stationary plate projecting into said conical lower end of the shell to a point near the contracted portion of the shell so as to leave a gas outlet between said plate and the contracted portion of the shell and a chamber in the upper side of said conical lower end above the water in the ash-pit, and a stationary pipe extending up into said chamber and through which the gas may be withdrawn, substantially as set forth.

10. A gas producer including an inclined shell for the coal, a hollow stirrer extending longitudinally through said shell, one of said members being revoluble, and means for introducing water into the lower end of said hollow stirrer.

11. A gas producer including a shell for the coal that is provided with a water-jacket about it, a hollow stirrer extending longitudinally through said shell, means for forcing water into the lower end of said stirrer, and a connection between the upper end of said stirrer and the water jacket at the upper end of said shell whereby the water will pass from the stirrer into the water jacket of said shell.

12. A gas producer including a revoluble shell for the coal that is mounted in an inclined position and having a water jacket about it, an ash-pit into which the lower end of the shell projects, a hollow stirrer extending longitudinally through said shell, means for forcing water into the lower end of said stirrer, a connection between the upper end of said stirrer and the water-jacket whereby the water will pass from the stirrer to the water-jacket, an annular trough about said shell near its lower end, and a cock for discharging the water from said water-jacket into said trough, whereby the water escaping from said cock will be conveyed into the ash-pit, substantially as set forth.

13. A gas producer including a revolving shell for the coal arranged in an inclined position, a coal supplying means mounted in connection with the upper end thereof, and dampers in said coal supplying means that exclude the air while the coal is passing into the shell.

14. A gas producer including a revolving shell for the coal arranged in an inclined position, a hopper connected with said shell by a tube for supplying coal thereto, a pair of spring-closed dampers in said tube one located farther from the shell than the other, and means for engaging said dampers in succession for opening the same, the outer dam-

per being opened first and the inner damper opened after the outer damper has closed.

15 15. A gas producer including a revolving shell for the coal, a dampered hopper connected with said shell and revoluble there-
5 with, a stationary hopper with a spring-closed damper in the bottom thereof and arranged in position for the revolving hopper to pass under it during each revolution and
10 means connected with the revolving hopper for operating the damper in said stationary hopper at each revolution to cause the coal in the stationary hopper to discharge into the revolving hopper.

15 16. A gas producer including a revolving shell for the coal, a dampered hopper secured thereto and that revolves therewith, a stationary hopper with a damper in the bottom of it and under which said revolving hopper

passes during each revolution, means on the 20 revolving hopper for operating the damper on the stationary hopper, a chute for supplying coal to the stationary hopper, a hood for closing the outlet of said chute, a lever ful-
25 crumed on said stationary hopper for operating said hood, and means on the revolving hopper for actuating said lever arranged so that the hood will be moved into a closing position when the stationary hopper empties to enable its damper to close.

30 In witness whereof, I have hereunto affixed my signature in the presence of the witnesses herein named.

MELVIN E. CROWELL.

Witnesses:

N. ALLEMONG,
H. B. McCORD.