

No. 876,079.

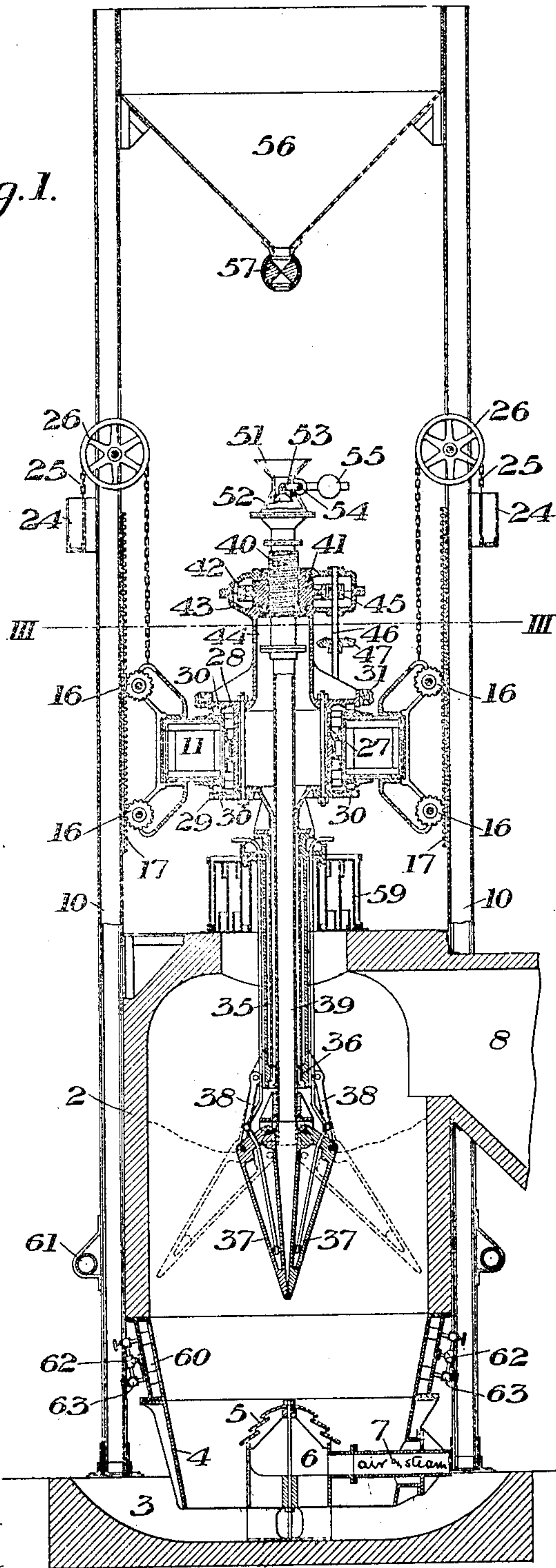
PATENTED JAN. 7, 1908.

N. McCONNELL.  
GAS PRODUCER.

APPLICATION FILED MAY 16, 1907.

3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

W. W. Swartz  
R. A. Balderson

INVENTOR

N. McConnell  
by Baker & Smith  
his attys

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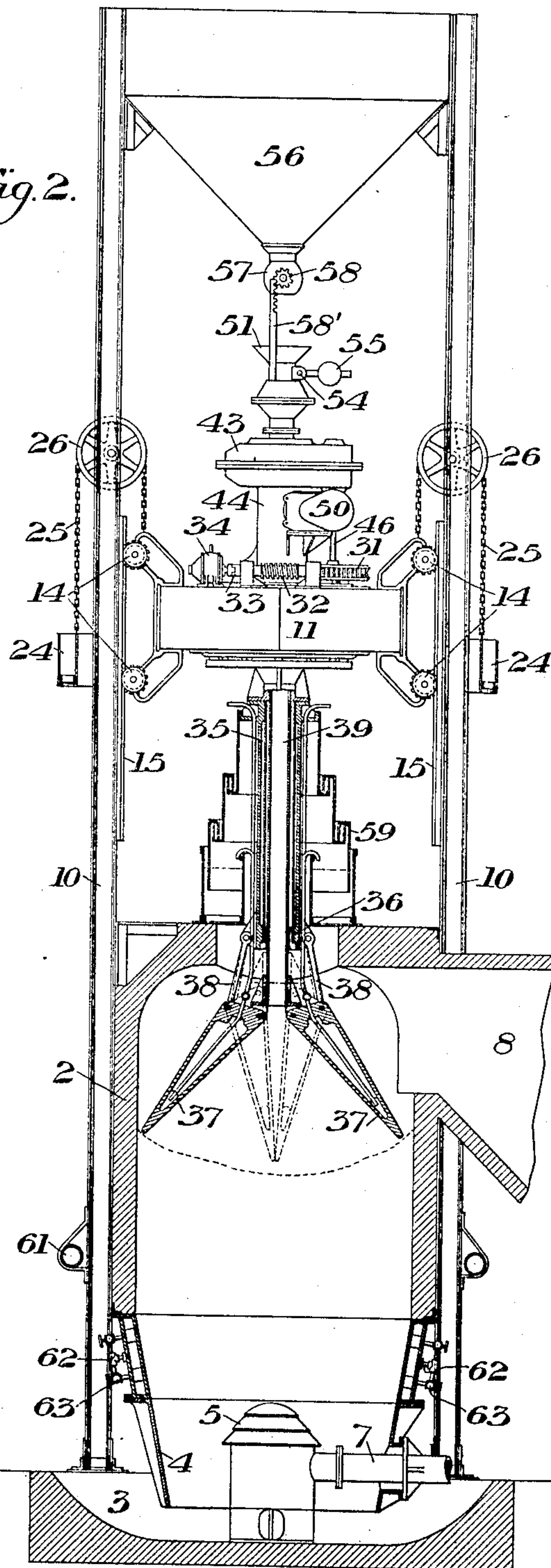
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3 SHEETS—SHEET 2.

Fig. 2.



WITNESSES

W. W. Swartz  
R. A. Balderson

INVENTOR

N. McConnell  
by Balderson & Swartz  
his attys

No. 876,079.

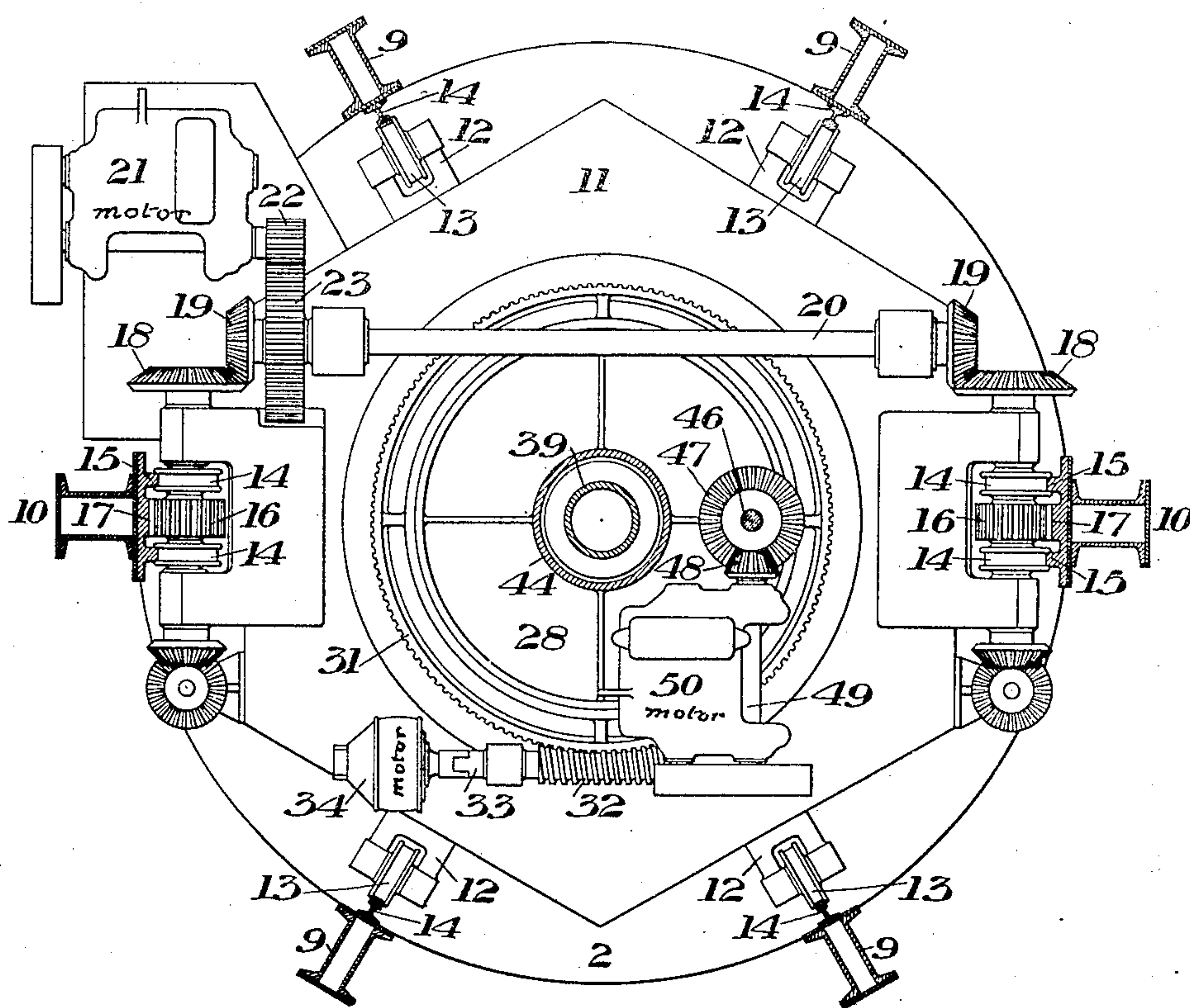
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3 SHEETS—SHEET 3.

Fig. 3.



WITNESSES

W. W. Swartz  
R. A. Balderson

INVENTOR

N. McConnell  
by *Patience Hynes*  
his atty.



# UNITED STATES PATENT OFFICE.

NIVEN McCONNELL, OF PITTSBURG, PENNSYLVANIA.

## GAS-PRODUCER.

No. 876,079.

Specification of Letters Patent.

Patented Jan. 7, 1908.

Application filed May 16, 1907. Serial No. 374,074.

*To all whom it may concern:*

Be it known that I, NIVEN McCONNELL, of Pittsburgh, Allegheny county, Pennsylvania, have invented a new and useful Gas-Producer, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical section of my improved producer; Fig. 2 is a sectional side elevation showing the parts in a different position; and Fig. 3 is a cross-section looking downward on the line III—III of Fig. 1.

My invention relates to the class of gas producers, and is designed to improve the feeding of the charge, the poking of the bed, and the operation of gas making.

It is further designed to provide for heating or superheating of the steam, where such is used in connection with inducing or forcing air into the producer.

Referring to the drawings, in which I show a preferred form of my invention, 2 represents the producer body which may be of any desirable size and shape, being shown as provided with a water-sealing trough 3, into which the lower iron shell 4 projects. The grate may be of any desired form, and I have shown a central grate 5 having annular outlets from the chamber 6, to which the air supply pipe 7 leads. The gas outlet from the top of the producer is shown at 8.

Surrounding the producer, I provide a series of vertical columns 9 and 10 which support and guide the charging apparatus. This charging apparatus comprises a main frame 11 having brackets 12 provided with wheels or rollers 14 which engage T-shaped guides 13 secured to the columns 9. The frame is also provided with shafts carrying rollers 14 engaging guides 15 upon the column 10, these shafts also having pinions 16 engaging stationary racks 17 upon the columns 10.

On the shafts carrying the rollers 14 and pinions 16, are provided bevel gear wheels 18 intermeshing with bevel gears 19 on a shaft 20 carried in suitable bearings on the charging frame. This charging frame carries an electric motor 21 having slow motion gearing 22 and 23 connecting it with the shaft 20. By actuating the motor 21, the entire charging machine may thus be raised and lowered. In order to reduce the work on this motor, I preferably counterweight the charging appa-

ratus; and for this purpose I have shown an annular weight 24 having flexible chains or wire ropes 25 extending over pulleys or wheels 26 on the columns, and connected to the main carrying frame of the charging device.

The main frame 11 is annular in form to receive within it a rotary carriage 27 which is preferably provided with upper and lower plates 28 and 29 which turn on roller bearings 30, the rollers being placed between these circular plates, and upper and lower tracks on the frame 11. The upper plate 28 is provided with a worm wheel 31 which is engaged by a worm 32 on shaft 33 connected to an electric motor 34 mounted on the frame 11. By actuating this motor, the carriage may be turned to bring the pokers hereinafter described to different angular positions. To the lower part of this carriage, is secured the hollow water-cooled tube 35 having at its lower end a hollow head 36 to which the hollow water-cooled pokers are connected by pivotal links 38. These pokers are also pivoted to the lower end of the feed tube 39 which extends within the water-cooled tube 35, and also through the hollow carriage 27. The upper portion of tube 39 is provided with an external screw 40 which engages the internally-threaded hub 41 of a gear wheel 42 mounted within a casing 43 carried on a tubular extension 44 of the turning carriage 27. The gear wheel 42 is engaged by pinion 45 on a vertical shaft 46 having a bevel gear wheel 47 intermeshing with bevel gear 48 on a shaft 49 actuated by electric motor 50 mounted on the main carrying frame 11. By actuating the motor 50, the feed tube may be forced upwardly or downwardly, thus acting to open or close the pokers 37.

At the top of the feed tube 39 is carried a hopper 51 whose mouth may be opened or closed by a bell 52 pivoted to a lever arm 53 on a shaft 54. The shaft 54 extends through the side of a recess in the hopper and is provided with a counterweighted arm 55 at a point external to the hopper.

Between the upper ends of the columns 9 and 10, is mounted a coal hopper 56 having a rotary feed valve 57 with a pinion 58 which is actuated by any suitable means not shown.

In order to seal the top opening of the producer through which the charging mechanism extends, I preferably employ a telescopic water sealing device 59 which is shown in



closed position in Fig. 1, and in elongated position in Fig. 2. The movable parts of this water-sealing device are lifted successively by the tube 35 as the charging mechanism is raised. The water cooling of the tube 35 and hollow pokers may be carried out by any suitable flexible or jointed connections arranged to provide for circulation of water therethrough to prevent cracking and burning out.

With my improved producer, I preferably employ a double-walled hollow bosh 60 into which steam is fed from annular pipes 61. The steam is superheated in this bosh by the heat from the bed of fuel, and then flows through outlet pipe 62 to the steam and air injectors 63 which feed steam and air into the bed.

In the use of the apparatus, the pokers are forced downwardly into the bed of fuel, being of tapering or wedge shape in the preferred form, for this purpose. This is accomplished by actuating motor 21, under whose action the entire charging machine is forced down. After reaching the desired position within the bed of fuel whose normal level is indicated by dotted lines, the pokers are opened by actuating motor 50, thus forcing down the feed tube, and causing the pokers to gradually diverge. The lower end of the feed tube and the space between the pokers is thus opened, and the charge of coal within the feed tube feeds down within the cavity formed by forcing down and opening the pokers within the bed. The charging machine is then raised, preferably with the pokers still in open position, and the charge of fresh coal or fuel is thus introduced into the center of the bed; while at the same time, the rising pokers thoroughly loosen the coal of the bed and break up all clinker formation. After the machine has reached its higher level, as shown in Fig. 2, the pokers are again closed by reversing the motor 50. During this closing of the pokers with the machine in its uppermost position, the screwing up of the feed tube will actuate and open the hollow gate 57 of the hopper 56. This gate is arranged to receive and contain the proper amount of charge which will then fall into the hopper 51 of the feed tube. The pokers now being closed and the charge received, the rotary portion of the charging apparatus is preferably turned by actuating motor 34 to bring the pokers to a different position. The charging machine is then lowered at the proper time to again force the pokers into the bed of fuel in the producer, and as they are again opened, the bell 52 will open and allow the charge of coal to descend through the feed tube to the center of the coal bed. This bell can be opened automatically at any desired point in the vertical movement of the charging machine, and as soon as the coal is discharged, the bell is

closed by the action of the counterweight, thus preventing any substantial escape of gases.

During the operation of the producer, air and steam may be fed in through the pipe 7 and grate 5, and superheated steam with air will pass in through the bosh injectors.

The advantages of my invention will be obvious to those skilled in the art. Hand poking and loosening of the bed is avoided, and the bed is thoroughly loosened and broken up by the power operation of the pokers. The fresh charges of fuel are fed in at the most desirable portion of the bed without exposure to the gas; thus preventing carrying out of coal dust or particles with the gas. The same apparatus performs the charging and poking operations. Measured amounts of fuel may be fed at desirable intervals, and owing to the peculiar manner of feeding these charges, an efficient and economical operation is provided with no skilled labor. The superheating of the steam, if this is employed, is obtained by radiation from the bed of fuel itself.

The producer may be used with or without a water-sealed bottom, and many other changes may be made in the form and arrangement of the producer, the pokers, the feeding mechanism, the operating connections, etc., without departing from my invention.

I claim:—

1. The combination with a gas producer, of a vertically movable charging and poking device movable through the top of said producer, and connections for forcing the device downwardly into the bed of fuel; substantially as described.

2. In a gas producer, a downwardly-movable poker formed of a plurality of parts, and connections arranged to spread said parts or move them toward each other; substantially as described.

3. In a gas producer, a vertically-movable poker arranged to be forced downwardly into the bed and formed of a plurality of hinged sections; substantially as described.

4. In a gas producer, a vertically-movable poker combined with a fuel feeding device, and connections for spreading or opening parts of the poker and releasing the charge; substantially as described.

5. In a gas producer, a poker formed of two or more tapered parts arranged to be forced downwardly into the bed of fuel, and a feed device arranged to discharge fuel between the parts of the poker; substantially as described.

6. In a gas producer, a charging machine mounted over the producer and having a vertically-movable poker and feeding device arranged to be forced downwardly; substantially as described.

7. The combination with a gas producer, 130



of a vertically-movable charging device there-  
over having a poker movable downwardly  
within the producer, and formed in a plural-  
ity of separable parts, connections for mov-  
5 ing said parts laterally from each other, and  
a feed device cooperating with the poker;  
substantially as described.

8. The combination with a gas producer,  
of a charging apparatus thereover, and mech-  
10 anism for turning said charging device to dif-  
ferent angular positions; said apparatus hav-  
ing a poker arranged to rotate therewith and  
to be forced downwardly into the bed of fuel  
in the producer substantially as described.

15 9. The combination with a gas producer,  
of a vertically-movable charging device  
mounted thereover, and having a head ar-  
ranged to enter the bed of fuel, and mechan-  
ism for forcing said head downwardly within  
20 the bed; substantially as described.

10. In a gas producer, a vertically-mov-  
able charging apparatus having a feed chan-  
nel extending to a lower head, and mechan-  
ism for forcing the head downwardly into the  
25 bed of fuel; substantially as described.

11. In a gas producer, a vertically-mov-  
able feeding apparatus extending through a  
hole in its top and provided with a movable  
closure at its lower end arranged to be forced  
30 into the bed of fuel; substantially as de-  
scribed.

12. In a gas producer, a vertically-mov-

able charging apparatus having poking de-  
vices carried thereby, and a stationary hop-  
per or bin arranged to feed successive charges 35  
to said apparatus; substantially as described.

13. In a gas producer, a vertically-mov-  
able charging apparatus mounted thereover  
said apparatus having a poking device at its  
lower portion, and connections arranged to 40  
feed fuel charges thereto during its move-  
ment; substantially as described.

14. A gas producer having a water-sealed  
vertically-movable charging apparatus ex-  
tending through its top; substantially as de- 45  
scribed.

15. A gas producer having a charging ap-  
paratus projecting through its top and pro-  
vided with poker devices, and connections  
for spreading the pokers; substantially as 50  
described.

16. A gas producer having a feed tube  
movable vertically within the furnace, a plu-  
rality of poker devices surrounding the lower  
portion of said tube, and mechanism for 55  
forcing the tube and pokers downwardly into  
the bed of fuel and for opening the same  
therein; substantially as described.

In testimony whereof, I have hereunto set  
my hand.

NIVEN McCONNELL.

Witnesses:

JOHN MILLER,  
H. M. CORWIN.