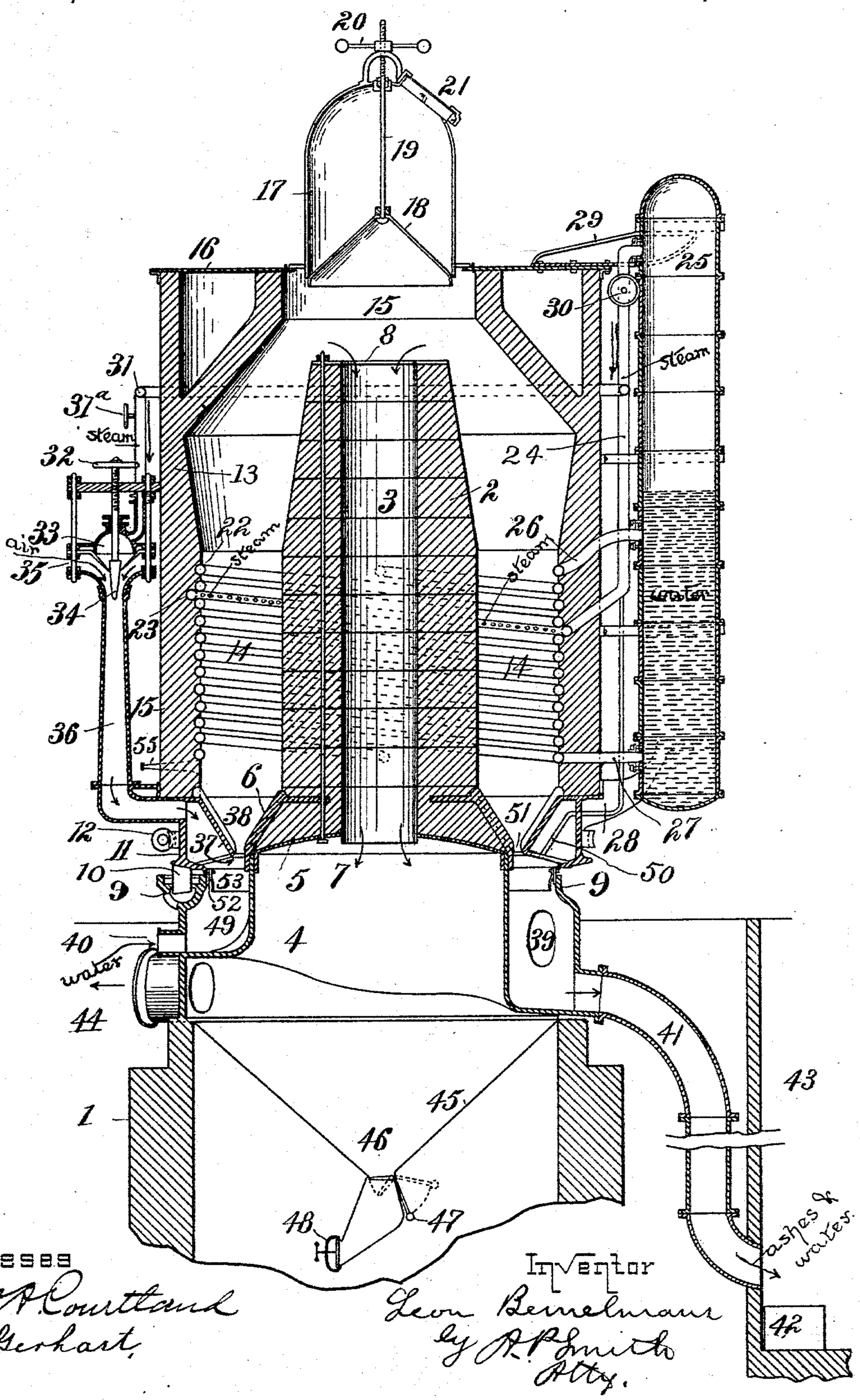
(No Model.)

L. BEMELMANS.

GAS PRODUCER.

No. 515,569. Patented Feb. 27, 1894.



Witnesses
W. P. Courtland
E. E. Gerhart.

Inventor
Leon Bemelmans
by R. P. Smith
Atty.

THE NATIONAL LITHOGRAPHING COMPANY.
WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

LEON BEMELMANS, OF BRUSSELS, BELGIUM.

GAS-PRODUCER.

SPECIFICATION forming part of Letters Patent No. 515,569, dated February 27, 1894.

Application filed May 1, 1893. Serial No. 472,463. (No model.) Patented in Belgium April 26, 1892, No. 99,433.

To all whom it may concern:

Be it known that I, LEON BEMELMANS, a citizen of the United States, residing at Brussels, in the Kingdom of Belgium, have invented certain new and useful Improvements in Gas-Producers, (for which I have obtained Letters Patent in Belgium, No. 99,433, dated April 26, 1892;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to that class of apparatus designed to manufacture fuel gas in large quantities for commercial use and generally known as gas producers. Its special object is to produce a compact and simple apparatus which can be operated successfully in small plants and which will avoid clogging of the combustion chamber by clinker and other difficulties which frequently result in the attempted operation of both large and small gas producers.

In the accompanying sheet of drawing, the figure represents a vertical central section of my apparatus.

The construction of the apparatus illustrated is as follows:

1, represents the foundations of the gas producer which may be of brick or stone or of cast iron or cement if preferred.

2, is the central stationary core of the gas producer which is rigid with the foundations. This core is hollow by virtue of the central passage-way 3, which acts as a down flue for the gases generated in the combustion chamber. This core is supported on the hollow casting 4, which rests directly upon the foundation. To the upper part of this casting 4, are secured the crown sheet 5, and the casting 6, upon which the brick work of the core 2, rests directly. This brick work of the core is held together by the top plate 8, and the tie rods 7, which pass through said top plate, the brick work and the crown sheet 5, binding them all together.

In the outer rim of the casting 4, are formed bearings 9, in which are journaled conical friction rollers 10. Upon these rollers rests the circular rail 11, which supports the exterior shell 13, of the furnace. This exterior shell 13, may be made to revolve upon the friction rollers 10, by means of the worm and screw 12. Between the core 2, and the external shell 13, is the annular combustion chamber 14. The top of the furnace is formed by the flat plate 16, which has a central opening 15, which is closed by the bell 18 and charging dome 17, in the well-known manner. The bell 18, is supported by the rod 19, controlled by the nut 20, and the charge is admitted to the dome 17, through the opening 21.

In the combustion chamber 14, and attached to the interior lining of the external shell of the furnace are several steam coils 22. There is also a circular steam pipe 23, which has its inner side split or perforated so that it will discharge its contents directly into the combustion chamber. This latter pipe 23, is fed by the pipe 24, which opens out of the upper portion of steam space of the separator 25. This pipe 24, is controlled by the throttle valve 30. The separator 25, is mounted on the external shell 13, of the furnace by means of the brackets 28, and 29. The lower portion or water space of the separator is connected to one or more of the coils 22, at the upper and lower extremities of said coil by the pipes 26, and 27. Although only one separator 25, is shown there might be in use as many of them as there are separate steam coils 22.

A branch pipe 31, leading from the main steam pipe 24, and controlled by the valve 31^a, furnishes steam to the injector or steam blower 33. Several of these injectors or steam blowers might be used. The said steam blower is controlled by the conical plunger 34, operated by means of the hand wheel and screw 32, in the well-known manner, The air enters through the openings 35, as indicated by the arrows and is forced by the action of the steam jet through the blast pipe 36, down into the closed ash pit 49, below the combustion chamber. The bottom of this combustion chamber 14, is formed by the inwardly tapering ring 37, and the outwardly tapering casting 6, previously described. These rings approach one another at their lower portions sufficiently near to prevent the charge of the furnace from falling through into the ash pit

when the outer shell 13, is stationary, but when the outer shell 13, is revolved and the ashes and clinker in the bottom of the combustion chamber are ground up by the action of the projections 38, the said ashes and clinker will fall down through the annular opening 51, into the ash pit 49.

55, represents one of the peep holes through which the condition of the charge can be examined. The blast which has been delivered into the ash pit is forced up through this annular opening 51, and through the charge of the furnace. The joint between the stationary casting 4, and the revolving rail 11, which forms the bottom of the rotating shell 13, is made air tight by means of the skirt 52, which is protected by the brass ring 53, both being attached to the inner edge of the circular rail 11.

39, is a man hole opening into the closed ash pit 49. 40, is a water inlet at the highest point of the sloping bottom of said ash pit 49, and 41, is the outlet for said ash pit placed at the lowest point of the said sloping bottom.

43, is a water tank and 42, a removable receptacle located below the mouth of the discharge pipe 41.

44, is the outlet from the gas chamber within the hollow casting 4, into which chamber the gases from the combustion chamber are discharged after passing through the down flue 3. 45, is a conical bottom to said gas chamber closed by the valve 46, which is operated by the weighted lever 47.

48, is the man hole opening into the trap beneath the valve 46.

50, is a small steam pipe discharging into the ash pit 49.

The mode of operation of my invention is as follows: The water tank 43, is filled so that the water line comes above the opening of the discharge pipe 41, thereby sealing all communication with the closed ash pit 49. The fuel is charged into the annular combustion chamber through the charging dome and bell in the well understood manner, and the fire is started by means of an auxiliary blast and admitted through the opening 40, or through the blast pipe 36 or by natural draft produced by opening the man hole 39 and the charging bell. The separators 25, being filled about half full of water, steam is rapidly generated in the steam coils 22, and passing down through the pipes 24, and 31, operates the steam blower 33, so that the apparatus becomes self-supporting as far as the generation of a blast is concerned. Steam is also admitted in proper quantities through the perforations of the circular pipe 23, and through the pipe 50 the latter being employed mainly when some particularly hard clinker is to be dissolved. The combustible gases generated by the dissociation of the hydrogen and oxygen of the steam and the partial combustion of the carbon in the combustion chamber together with certain hydrocarbon gases pass on through the down flue 3, into the gas chamber and out through the discharge pipe 44, to any suitable holder provided for them or directly to the point of consumption. Rotation of the outer shell 13, of the furnace upon the friction rollers 10, by means of the worm 12, works the ashes down through the annular opening 51, into the ash pit and keeps the charge of the furnace moving downward as fast as it is burned out and also keeps the fire even. Whenever a sufficient quantity of ashes is accumulated in the ash pit 49, a stream of water is forced in through the opening 40, and the contents of the ash pit are flushed out through the discharge pipe 41, and deposited in the box 42. When this box is full it can be removed and emptied.

Certain impurities in the shape of fine dust will evidently pass down the flue 3, with the gases generated in the combustion chamber. These, on account of their greater weight and momentum, will pass on in a direct line and accumulate in the conical bottom 45, of the gas chamber. When a sufficient quantity has accumulated, the weighted valve 46, will open automatically and discharge that quantity into the trap beneath. The man hole 48, can be opened at intervals and the contents of the trap removed.

It is evident that by charging fuel into the furnace at proper intervals, replenishing the supply of water in the separators 25, and rotating the furnace to force the ashes and clinker down into the ash pit, the operation of my gas producer can be rendered continuous and is absolutely under control. The regulation of the steam blower 33, the steam admitted through the perforated pipe 23, and that discharged into the ash pit through the pipe 50, enables the operator to have absolute control over the chemical combinations going on within the combustion chamber 14, and so to regulate the amount and quality of the gas which is generated and delivered in a continuous stream through the discharge opening 44.

Of course various changes could be made in the construction of my apparatus without departing from the principles herein set forth and without lifting it out of the scope of my invention, thus one surface of the combustion chamber could be made to move relatively to the other by giving that side a vertical reciprocating motion instead of a horizontal rotating movement but so long as one of the vertical, or approximately vertical, sides of the combustion chamber has a motion of whatever nature relative to another side, the desired object of breaking up the formation of clinker and the settling down equably of the charge of burning fuel so as to fill up all blow holes and other hollow spaces through which the draft would pass without sufficiently mingling air with the coal, is secured.

Having, therefore, described my invention, what I claim as new, and desire to protect by Letters Patent, is—

1. In a gas producing furnace, an annular combustion chamber formed by a stationary core within and a revoluble cylindrical shell without, and means for revolving the shell, in combination with such stationary core and outer revoluble shell, substantially as described.

2. In a gas producing furnace, an annular combustion chamber formed by a stationary hollow core within and a revoluble cylindrical shell without, said outer shell being normally closed at the top, and means for revolving the shell in combination with such stationary hollow core and such outer revoluble shell, substantially as described.

3. In a gas producing furnace, the combination of the foundation and the central core rigid therewith, the friction rollers journaled in bearings supported by said foundation, the outer shell resting and revolving on said friction rollers, and the gearing for causing said revolution substantially as described.

4. In a gas producing furnace, the combination of the foundation and the central core rigid therewith, the friction rollers journaled in bearings supported by said foundation, the outer shell resting and revolving on said friction rollers, and the gearing for causing said revolution together with one or more series of steam coils mounted on the inside of said outer shell, and one or more separators connected therewith, substantially as described.

5. In a gas producing furnace, the combination of the annular chamber, the rigid base, the stationary core, the outer revolving shell, the base of which core flares outwardly while the base of the shell flares inwardly thereby forming an annular bottom for said combustion chamber with an annular opening for the same, projections upon said flaring portions for breaking up the cinder, and means for revolving the outer shell, substantially as described.

6. In a gas producing furnace, the combination of the annular combustion chamber, the rigid base, the stationary core, the outer revolving shell, the base of which core flares outwardly while the base of the shell flares inwardly thereby forming an annular bottom for said combustion chamber with an annular opening for the same, projections upon said flaring portions for breaking up the cinder, and means for revolving the outer shell, together with steam generating apparatus carried by the outer shell, and one or more steam blowers which deliver their blast at the bottom of the combustion chamber, substantially as described.

7. In a gas producing furnace, the combination of the deep annular combustion chamber bounded by a rigid central shell within and a revoluble cylindrical shell without, a steam generating apparatus, and a circular steam coil arranged around said combustion chamber, and perforated so as to discharge steam into the midst of the burning fuel, substantially as described.

8. In a gas producing furnace, the combination of the cylindrical outer shell within which is centrally located a hollow core which acts as a down flue for the gases, a gas chamber in the base of the furnace, and an outlet for said chamber, an annular ash pit surrounding said gas chamber and having its bottom inclined from a water inlet on one side to the discharge outlet on the other, together with said water inlet and water outlet, substantially as described.

9. In a gas producing furnace, the combination of a combustion chamber, the closed ash pit below it, the inlet for water at one side of said ash pit, a discharge pipe opening out of the other side of said ash pit, and a water tank into which and beneath the water line of which the said discharge pipe opens, whereby said ash pit can be cleaned without destroying the water seal, substantially as described.

10. In a gas producing furnace, the combination of the foundations, the revoluble shell resting upon said foundation, the ash pit adjacent to the parting line between said foundation and revoluble shell, the skirt of flexible material covering said line and the projecting rim of thin metal over said skirt, substantially as described.

11. In a gas producing furnace, the combination of a combustion chamber, the closed ash pit with an inclined bottom below it, the inlet for water at one side of the said ash pit and discharge pipe opening out of the other side of said ash pit and proper mechanisms for closing said inlet and outlet, substantially as described.

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

LEON BEMELMANS.

Witnesses:
GEO. W. ROOSEVELT,
GREGORY PHELAN.