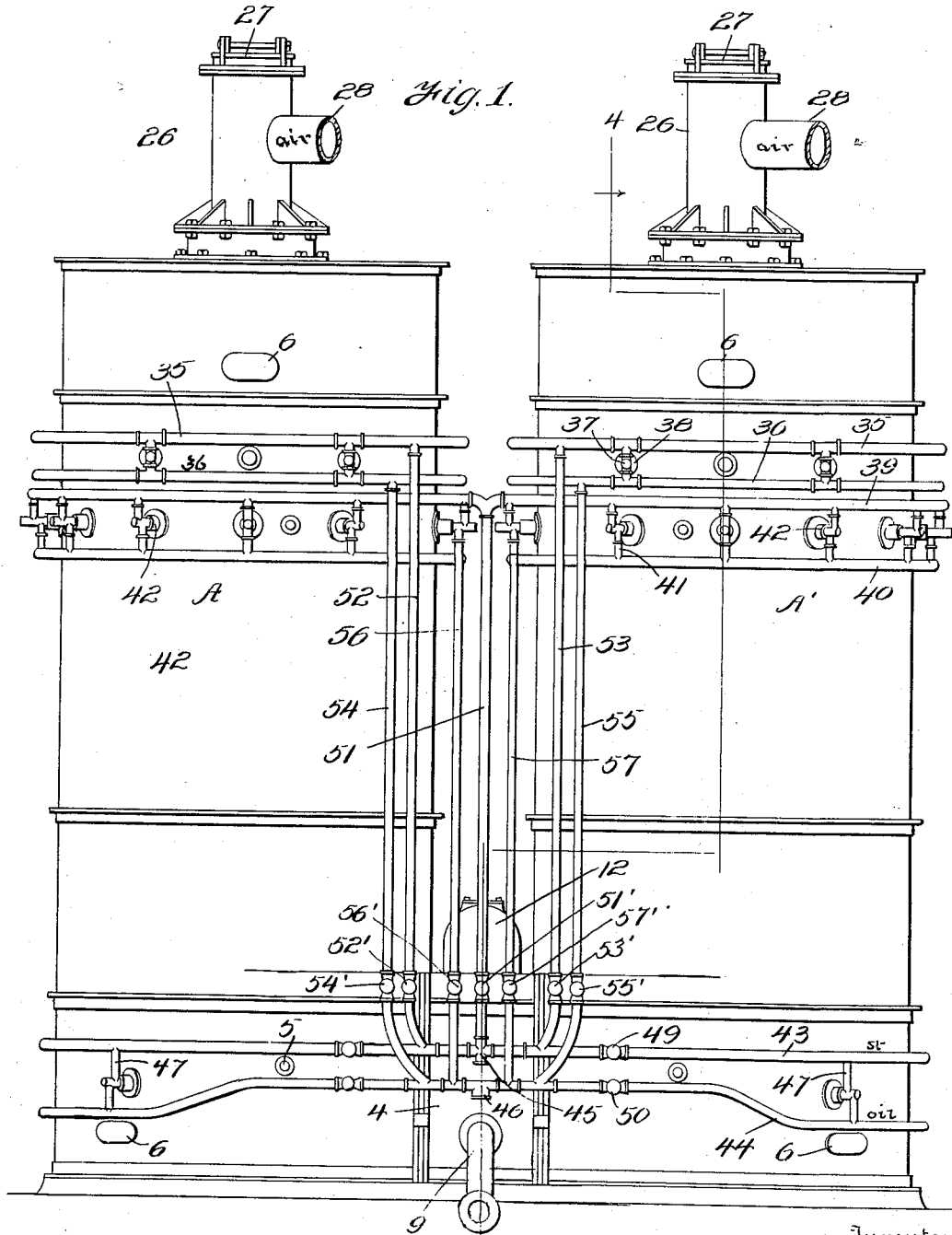


A. D. BRASSON & A. A. YANKEE.
GAS GENERATING APPARATUS.
APPLICATION FILED FEB. 25, 1910.

969,085.

Patented Aug. 30, 1910.

4 SHEETS—SHEET 1.



Witnesses
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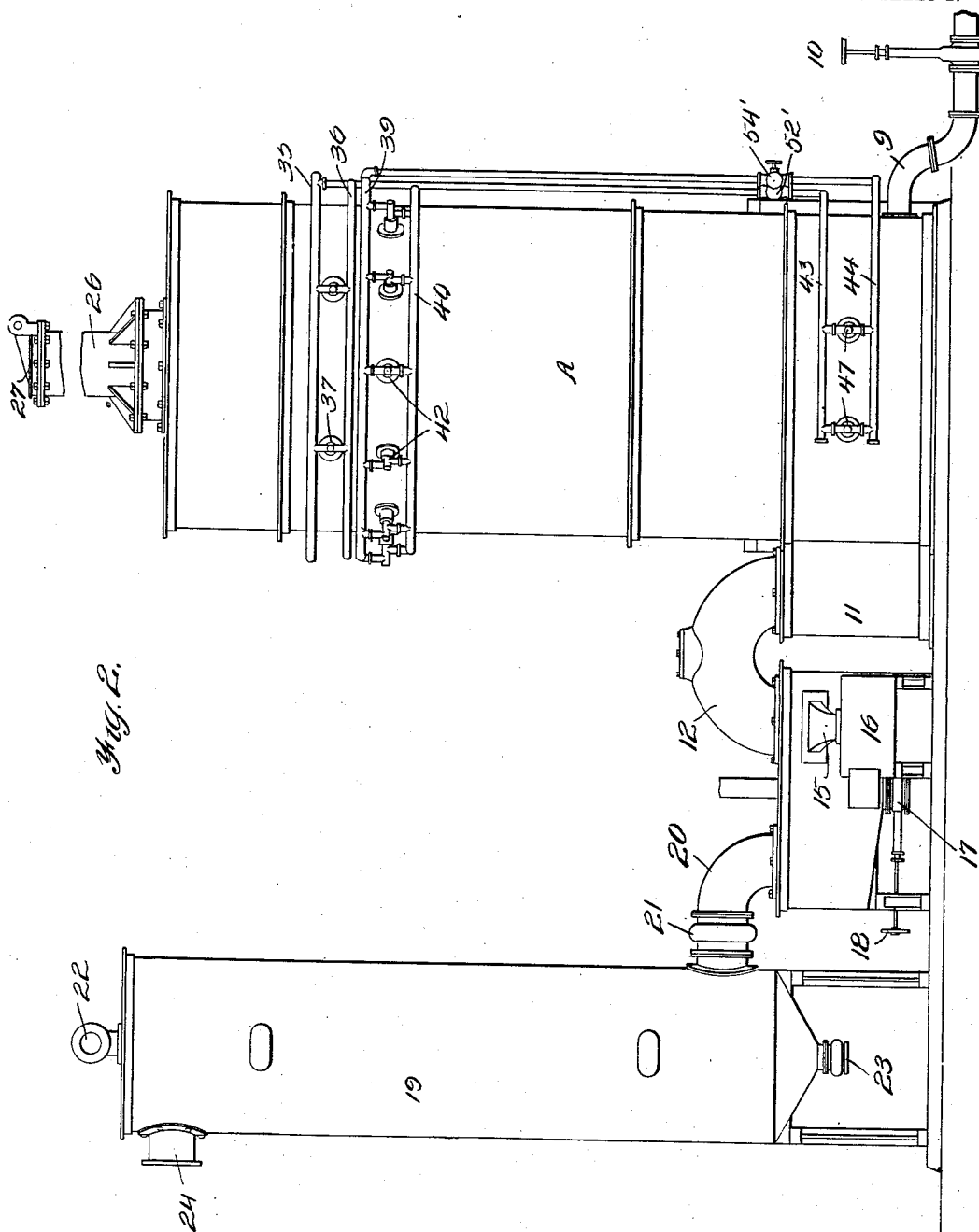


Fig. 2.

Witnesses

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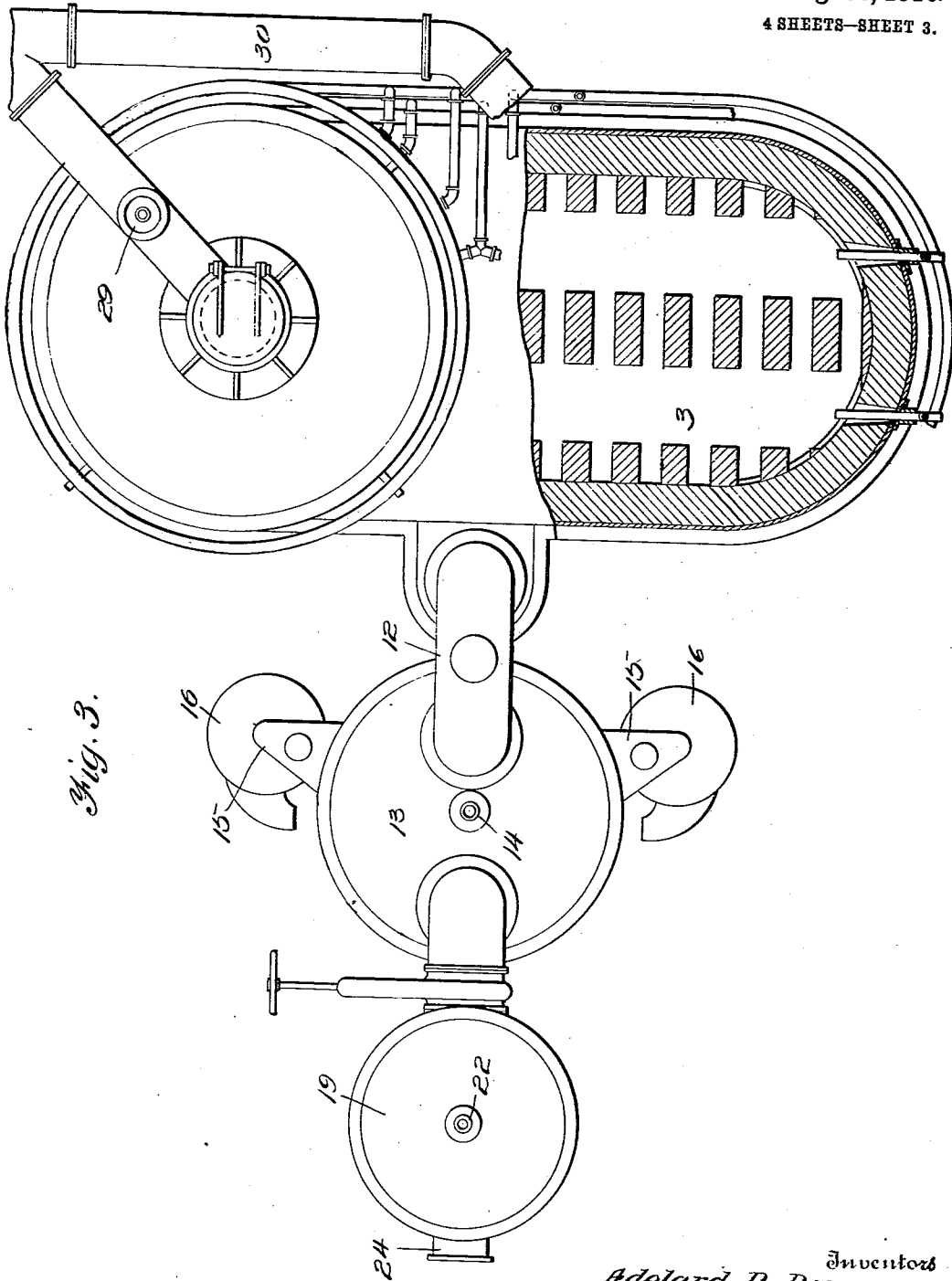


Fig. 3.

Witnesses
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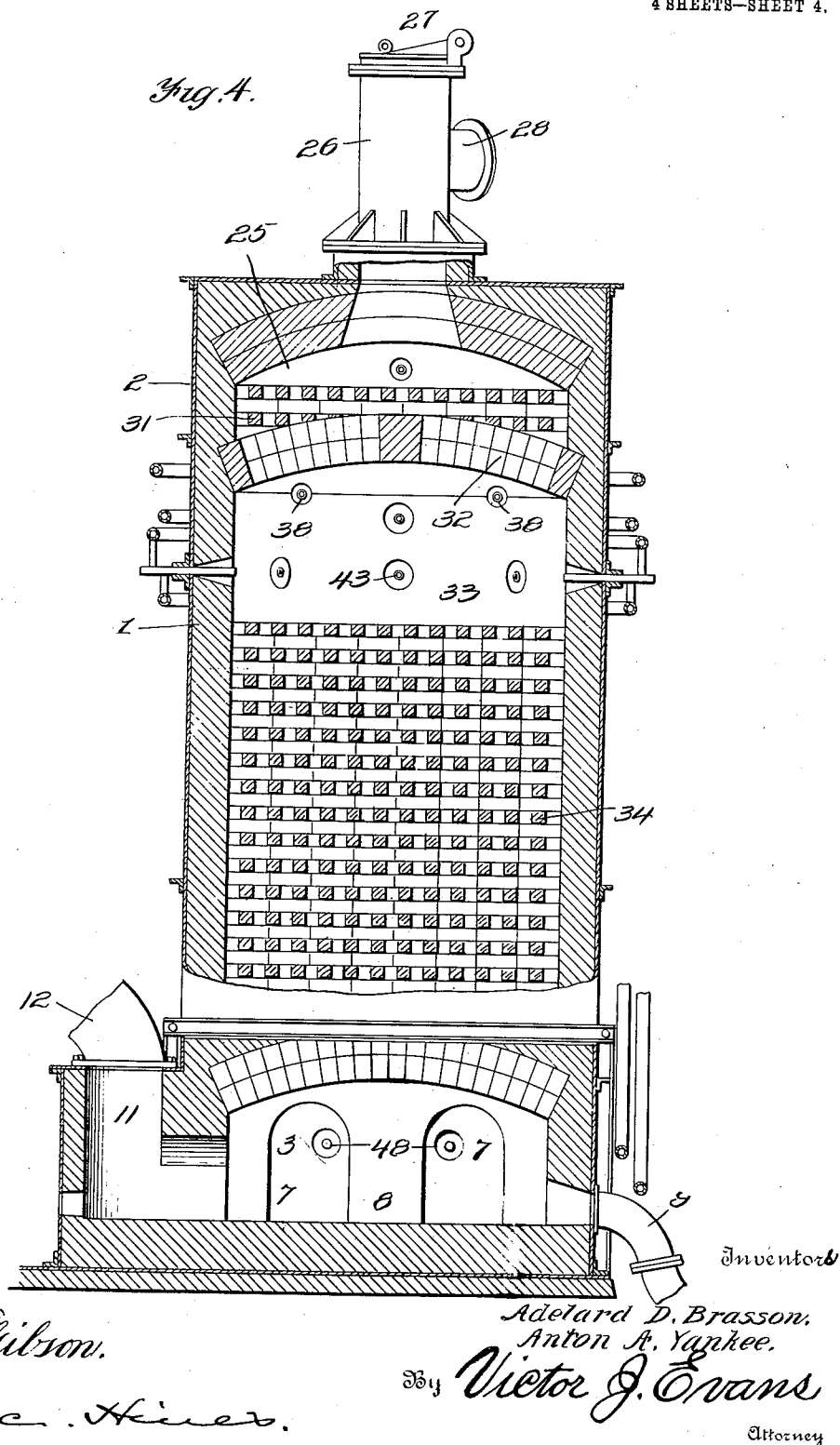
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

ADELARD D. BRASSON AND ANTON A. YANKEE, OF SAN FRANCISCO, CALIFORNIA.

GAS-GENERATING APPARATUS.

969,085.

Specification of Letters Patent. Patented Aug. 30, 1910.

Application filed February 25, 1910. Serial No. 545,883.

To all whom it may concern:

Be it known that we, ADELARD D. BRASSON and ANTON A. YANKEE, citizens of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented new and useful Improvements in Gas-Generating Apparatus, of which the following is a specification.

10 This invention relates to gas generating apparatus of that type designed for the production of gas from liquid hydrocarbons and which embodies generating chambers containing a mass of regenerative material adapted to be heated to the desired temperature for producing gas from a mixture of steam and oil passing therethrough, said chambers being constructed and connected for the passage of a blast of air in either direction, so that the regenerative material in the chambers may be effectively heated by the combustion of steam and oil and the traverse of the heat through the influence of the blast.

25 The object of the invention is to provide a generator of the double down run type wherein the regenerative material in both generating chambers will be heated simultaneously and both chambers may be employed simultaneously for the production of gas, thus securing an increased production with less fuel for heating purposes and greater economy of operation by avoidance of the waste of heat occurring in the use of but a single generator after both have been preliminarily heated, as is customary in generators of this type.

40 A further object of the invention is to improve and simplify the construction and increase the practical efficiency of gas generators of this character, as well as to provide a machine which may be readily cleaned and repaired and is not liable to get out of order.

45 With these and other objects in view, the invention consists of the features of construction, combination and arrangement of parts hereinafter fully described and claimed, reference being had to the accompanying drawings, in which:—

50 Figure 1 is a front elevation of a gas generating apparatus constructed in accordance with our invention. Fig. 2 is a side elevation of the same. Fig. 3 is a top plan view, showing one of the generators in horizontal section, the section being taken

through the lower combustion chamber thereof. Fig. 4 is a vertical section taken on the plane indicated by the irregular line 4—4 of Fig. 1.

60 Referring to the drawings. A and A' designate the two generators of the apparatus which may be of any approved construction and preferably of upright cylindrical form and consisting of a masonry wall 1 inclosed in a metal shell 2, each generator being provided at its base with a combustion chamber 3, the two combustion chambers being in permanent communication through a connection 4 disposed between the lower ends of the generators, as clearly shown in Figs. 1 and 4. The generators are provided at desired points with suitably closed peep holes 5, and the generators and connection 4 are also provided at suitable points with manholes covered by plates 6. The combustion chambers 3 of the two generators are in communication through passages 7 with a mixing and discharge chamber 8 formed by the connection 4. The chamber 8 has communicating therewith a secondary blast pipe 9 provided with a controlling valve 10, and has an outlet passage 11 from which leads a gas discharge pipe 12.

85 The discharge pipe 12 is arranged to conduct the gas to a washer 13 of any preferred construction, which receives water through a supply pipe 14. The washer overflows through the discharge spout 15 into seal pots 16 of any approved construction, and the carbon separated from the gas passes off with the overflow water from the washer. The washer is provided at its bottom with a drain outlet 17 controlled by a valve 18, by which it may be cleaned out at any time. The washed gas is drawn off from the washer into a suitable type of scrubber 19 through a connecting pipe 20 provided with a controlling valve 21. The scrubber is provided with a water inlet 22 a valved drain outlet 23 and a gas discharge connection or outlet 24, through which latter the gas may be drawn off for discharge into any suitable storage reservoir.

105 Each generator is provided with an upper or top combustion chamber 25 with which communicates a flue 26 adapted to be closed at its upper end by a valve 27 and provided at one side with an air blast pipe or connection 28 having a controlling valve 29, the connections 28 of the two generators communicating with a common air supply pipe

30 through which air under pressure may be supplied from any suitable source. The chamber 25 contains a body of regenerative material 31, supported upon an arch 32 and composed of a checker work of fire brick or other suitable material. Below the arch 32 is a combined mixing and combustion chamber 33, and within the generator between said chamber 33 and the lower combustion chamber 3 is a mass of regenerative material 34, also preferably composed of a checker work of fire brick, supported by an arch forming the top of said lower combustion chamber.

Surrounding the upper portion of each generator are two sets of steam and oil pipes—one set designed for heating and the other for gas producing purposes. One of these sets comprises a steam pipe 35 and oil pipe 36 which are connected by suitable branches 37 with injector nozzles 38 entering the combined mixing and combustion chamber 33. The other set of pipes comprises a steam supply pipe 39 and an oil pipe 40 connected by branches 41 with nozzles or ejector burners 42 which enter the chamber 33. Surrounding the base of the apparatus, that is extending completely around both generators are main steam and oil supply pipes 43 and 44 which are adapted to be respectively coupled to conductors leading from the sources of steam and oil supply at the points 45 and 46. Branches 47 connect said pipes 43 and 44 with injector burners or nozzles 48 which enter the lower combustion chambers 3 of the generator. Between the said connections 45 and 46 and the branches 47 leading to the nozzles 48 each side of the apparatus the pipes are provided respectively with controlling valves 49 and 50. From the pipe 43 extends a pipe 51 which is coupled to the steam pipes 39 of the two generators and is provided with a controlling valve 51'. Leading from the pipe 43 on opposite sides of the pipe 51 are pipes 52 and 53 respectively which independently connect the pipe 43 with the steam pipe 35 of the two generators and are provided respectively with controlling valves 52' and 53'. Pipes 54 and 55 connect the oil pipe 44 with the oil pipes 36 of the respective generators and are provided with controlling valves 54' and 55', while pipes 56 and 57 connect the pipe 44 with the pipes 40 and nozzles 42 of the respective generators and are provided with controlling valves 56' and 57'. It will be observed that all of the valves controlling the flow of oil, steam and air are arranged at the front of the machine in a position for convenient manipulation, so that the entire operation of the machine may be governed from a single point.

In order to supply sufficient oil and steam for the generation of a maximum amount of gas at a determined pressure within a given

amount of time, the injectors 43 should be made comparatively large. At the same time if these injectors were employed for the initial heating, which requires but a relatively small amount of oil and steam, a waste of oil and steam would result, as too much oil and steam would be supplied. We, therefore, employ the injectors 38 in addition to the injectors 43 and make them preferably of relatively smaller size, so that said set 38 may be employed solely for initial heating and to supply only a sufficient amount of oil and steam for the purpose.

In operation, assuming all valves to be closed, the valve 27 of generator A and valve 29 connected with the air blast 28 of the generator A' is opened, after which the valves 53' and 55' are opened, to inject steam and oil through the nozzles 38 into the combined mixing and combustion chamber 33 of the generator A'. The charges being ignited, said chamber will be heated, as will the arch 32 and regenerative material 31, heating the blast as it passes downward therethrough, which blast will in turn heat the regenerative material 34. As soon as the heat begins to pass from generator A' to generator A through the chamber 8 of connection 4, valve 10 is opened to augment the blast and valves 49 and 50 are opened for the injection of steam and oil into combustion chamber 3 of generator A', the mixture being ignited and further heating the blast which, on its upward travel through generator A, heats the bodies of regenerative material therein and finally discharges through the outlet 26 of said generator. The steam valves are open at the times named to admit steam with the oil when the generators are clean or free from carbon deposits. If, however, the generators are coated with deposits of this character, a restricted amount of oil may be admitted with the air and allowed to burn to partially or wholly consume the carbon before the full supply of oil and steam are admitted. After the bodies of regenerative material in the two generators have been brought to a proper temperature, valves 10, 27, 49, 50, 53', 55' and 29 are closed and valve 21 is opened, after which valves 57', 51' and 56' are opened, thus injecting steam and oil through nozzles 42 into the combined mixing and combustion chambers of both generators. The mixture is vaporized in these chambers and rarified and heated on its down flow through the regenerative bodies, insuring the production of gas containing a proper percentage of oil, and then the currents of gas discharge into the connection 4 and through pipe 12 into the washer, thence to the scrubber and finally to the storage reservoir pipe 12 into the washer, from thence to the scrubber and finally to the storage reservoir.

When the regenerative materials in the generators have become so reduced in temperature that gas can not be economically produced, that is, when the temperature is
 5 so low that the gas would be too rich, the opened valves above mentioned are closed and the generators again heated in the manner previously described, except in the reverse way, the generator A being employed
 10 as the heating generator, the air being drawn in through the stack 26 of said generator, while the products of combustion discharge through the corresponding stack of the generator A'. After the bodies of regenerative
 15 material have been heated sufficiently for the second run, the producing operation is again carried out in the manner hereinbefore described and which will be obvious from the foregoing description.

20 It will be observed that in the operation of the apparatus both generators are simultaneously utilized for generating gas, and both simultaneously heated for the subsequent operation, and that as a consequence
 25 greater efficiency is secured, as well as an increase of product, over generators of that type in which after both generators are heated but one is employed for producing, allowing the heat within the other to go to waste.
 30 Having described our invention, we claim:—

1. A gas generating apparatus comprising a pair of generators in communication at their lower ends, each generator having a
 35 stack with an air blast pipe connected therewith and provided with a top combined mixing and combustion chamber and a bottom combustion chamber, a set of oil and steam injector nozzles communicating with the
 40 lower combustion chamber, a set of oil and steam injector nozzles communicating with the upper combined mixing and combustion chamber, supply pipes connected with said nozzles, distributing pipes connecting the
 45 supply pipes of both generators with each other and provided with controlling valves, and a secondary air blast means communicating with the connection between the generators.

50 2. A gas generating apparatus comprising a pair of generators each having a stack at its upper end provided with a valve and a valved air blast connection, said generators being in communication at their lower ends
 55 and each provided at its lower end with a combustion chamber and in its top with a combined combustion and mixing chamber, a body of regenerative material in each generator between said chambers, main oil and
 60 steam supply pipes, sets of steam and oil supply connections leading into the chambers of the generators, certain of said connections leading directly from said main supply pipes, branch pipes between the other
 65 oil and steam connections up both gener-

ators and said main oil and steam supply pipes, and valves for controlling said main and branch pipes, whereby the generators may be heated from each other and gas simultaneously produced in each generator, 70 the connecting portion of the generators being provided with a gas outlet.

3. A gas generating apparatus comprising a pair of generators having stacks at their upper ends provided with valves and air 75 blast pipes having valves therein, and connected at their lower ends with each other, each generator being further provided with an upper combined mixing and combustion chamber, a connection between the two generators having a secondary air blast pipe 80 connected therewith, and a gas discharge outlet leading therefrom, a lower set of air and steam supply pipes for the lower combustion chamber of each generator, said 85 pipes having injector nozzles connected therewith and extending into the combustion chamber, two sets of steam and oil supply pipes for the upper combined combustion and mixing chamber of each generator, 90 each set having connecting nozzles extending therefrom into the chamber, a valved pipe connecting the lower steam pipe with the steam pipes of one of the upper sets of both generators, valved pipes connecting the 95 lower steam pipe independently with the steam pipes of the other sets of upper connections of the generator, and valved oil supply pipes connecting the oil pipe of the lower set with the oil pipes of the upper sets 100 of the pipes of both generators.

4. A gas generating apparatus comprising a pair of generators in connection at their lower ends, each generator having a stack 105 with an air blast pipe connected therewith and provided with a top combined mixing and combustion chamber, and a bottom combustion chamber, a set of oil and steam injector nozzles communicating with the lower 110 combustion chamber, a set of oil and steam injector nozzles communicating with the upper combined and combustion chamber, a body of regenerative material within each generator between the stack and upper mixing 115 and combustion chamber, a body of regenerative material within each generator between the two chambers, supply pipes connected with said nozzles, distributing pipes connecting the supply pipes of both generators with each other and provided 120 with controlling valves, and a secondary air blast means communicating with the connection between the generators.

In testimony whereof we affix our signatures in presence of two witnesses.

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 ANTON A. YANKEE.

Witnesses:

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 LOUIS F. SNYDER.