

No. 772,224.

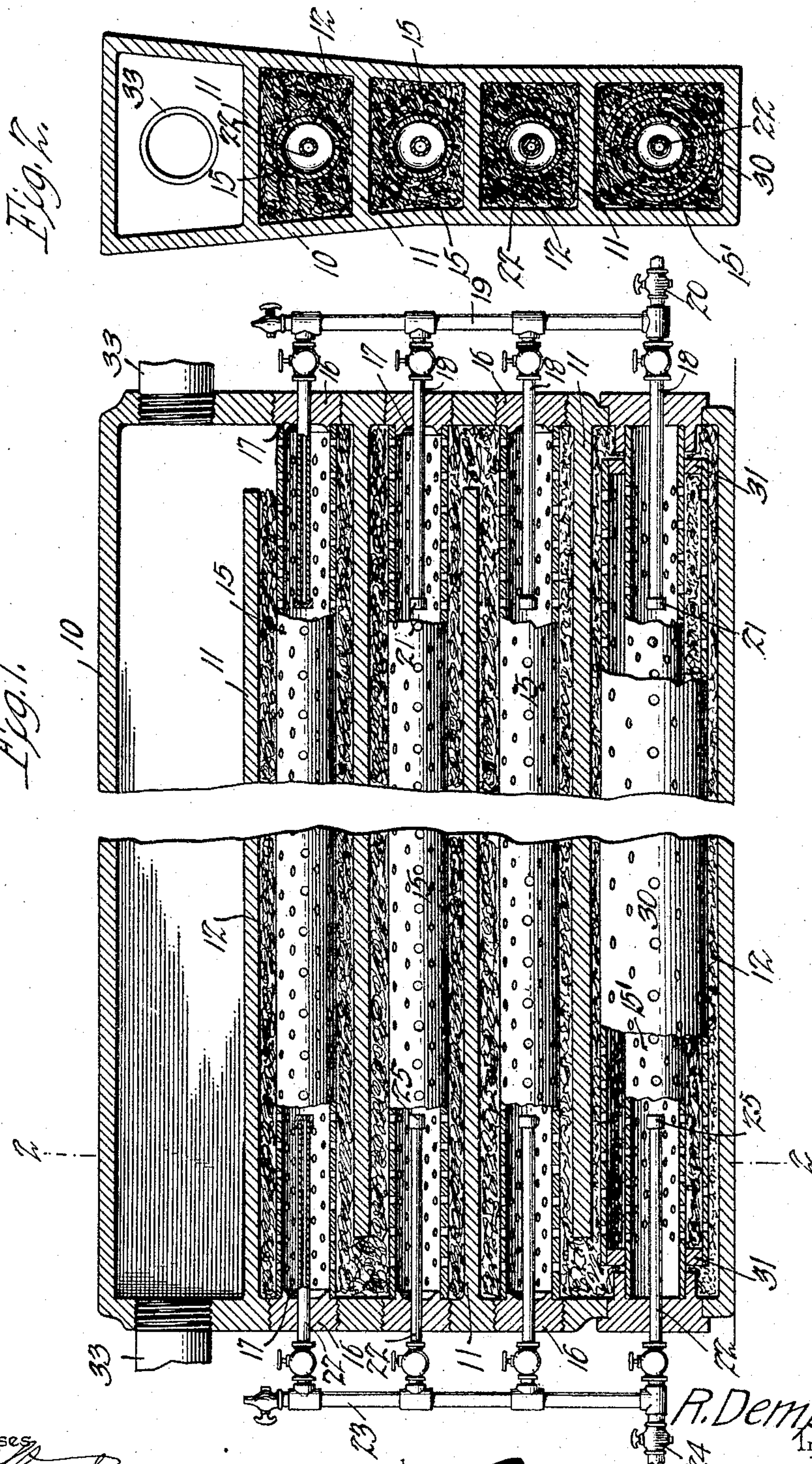
PATENTED OCT. 11, 1904.

R. DEMPSTER.
APPARATUS FOR MANUFACTURING GAS.

APPLICATION FILED NOV. 20, 1902. RENEWED FEB. 23, 1904.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses
E. J. Stewart
John E. Parker

by

C. A. Snow & Co.
Attorneys

R. Dempster,
Inventor

No. 772,224.

PATENTED OCT. 11, 1904.

R. DEMPSTER.

APPARATUS FOR MANUFACTURING GAS.

APPLICATION FILED NOV. 20, 1902. RENEWED FEB. 23, 1904.

NO MODEL.

2 SHEETS--SHEET 2.



Witnesses

E. F. Stewart 7-12
Jno E Parker

by

R. Dempster, Inventor:

C. Snow & Co.
Attorneys

UNITED STATES PATENT OFFICE.

ROBERT DEMPSTER, OF MARIETTA, OHIO.

APPARATUS FOR MANUFACTURING GAS.

SPECIFICATION forming part of Letters Patent No. 772,224, dated October 11, 1904.

Application filed November 20, 1902. Renewed February 23, 1904. Serial No. 194,879. (No model.)

To all whom it may concern:

Be it known that I, ROBERT DEMPSTER, a citizen of the United States, residing at Marietta, in the county of Washington and State of Ohio, have invented a new and useful Apparatus for Manufacturing Gas, of which the following is a specification.

This invention relates to certain improvements in apparatus for the manufacture of gas, and has for its principal object to provide an apparatus in which a plurality of connected superposed chambers are provided with air and oil supply pipes and simultaneously form a number of volumes of gas that is passed through a finely-divided material contained within the chambers and more thoroughly subjected to the action of heat.

With this and other objects in view the invention consists in the novel construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a longitudinal sectional elevation of a retort constructed in accordance with the invention. Fig. 2 is a transverse sectional elevation of the same on the line 2 2 of Fig. 1. Fig. 3 is a detail view, on an enlarged scale, of one of the retort-chambers. Fig. 4 is a view, partly in the nature of a diagram, illustrating an apparatus or plant for the production of gas from hydrocarbon and air.

Similar numerals of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

In carrying out the invention I employ a retort placed in a suitable furnace and there subjected to the action of heat, the retort being preferably heated to a cherry-red, and into said retort I inject at one end air and at the other end a mixture of air and hydrocarbon to form a spray or mist, and while a single retort may be used it is preferred for the sake of economy to employ a number of su-

perposed and connected retorts so arranged as to form practically a single retort-chamber.

The preferred construction is illustrated in Figs. 1 and 2, wherein 10 designates a metallic casing approximately rectangular in form and divided by a plurality of partitions 11 into a number of superposed chambers 12. The partitions extend from side to side of the casing, but terminate short of one end thereof in order to form communicating spaces disposed alternately at opposite ends of the casing and providing a tortuous passage for the manufactured gas. Each of the chambers forms a separate retort, and these may be of slightly-different construction, as illustrated in Fig. 1. In the preferred form a perforated tube 15 is disposed centrally within each chamber, the ends of the tubes abutting against threaded plugs 16, fitted in threaded openings in the opposite ends of the casing and provided with suitable lugs or flanges 17 to assist in maintaining the tubes in position. The space around each of the tubes is filled with asbestos, which may be mixed with other suitable material to break up the oil and form an extensive heating-surface for contact with the molecules of hydrocarbon. Each of the plugs 16 is provided with a centrally-disposed opening for the passage of a pipe, each of the pipes 18 being connected to a pipe 19, through which air and oil are forced under pressure, a controlling-valve 20 being employed to govern the quantity of oil admitted to the retort. The inner end of the pipe 18 is provided with a perforated cap 21, through which the mixture of air and oil is forced in a fine jet or spray toward the central portion of the retort-chamber. Through the plug at the opposite end of the retort extends a pipe 22, connected to an air-supply pipe 23 and provided with a controlling-valve 24. The inner end of the pipe 22 is provided with a perforated cap 25, through which a jet of heated air is forced in the direction of the entering jet of air and oil. The entering jets meet at about the central portion of the retort-chamber, resulting in the formation of a heavy vapor or mist, the particles of hydrocarbon being very finely divided and in this condition subjected to the heat

of the retort. Both the air and oil are forced in under pressure, and as the heating operation continues the volatile portions of the oil, together with a proportion of air, pass off through the perforations in the tubes 15 and are forced under pressure through the asbestos fiber, the asbestos being highly heated to transform the vapors into a fixed gas. The mechanical vaporizing action in the retorts is of such nature that no time is allowed for the heavier carbonaceous matter to fall to the bottom of the retort, and owing to the heating operation combustion will to some extent take place and prevent the accumulation of tarry deposits. The air and oil vapor or gas are forced out under pressure through the perforations in the tubes and pass through asbestos fiber, which serves not only as a heating agent but also acts in a measure as a strainer or filter which will retain any heavier particles of carbonaceous material and subject the same to the intense heat of the fiber, sufficient air passing over to consume the particles thus held, so that the retort is at all times free from tarry and other deposits. In the lower portion of the casing, as illustrated in Figs. 1 and 2, is a slightly-modified form of retort comprising a perforated tube 15', extending, as before, from end to end of the retort and held in place by the end caps. This tube is surrounded by a second perforated tube 30, held in position by annular rings 31, carried by the end portions of the tube 15'. The space between the two tubes is preferably packed with asbestos fiber, as well as the space around the outer tube 30. The several chambers form a connected series of retorts, and from the upper chamber the manufactured gas may be conducted to a gasometer or to a point of consumption by means of a pipe or pipes 33. In arranging a plant or system for carrying on the manufacture of gas the retort or retorts are placed within a suitable furnace, which may be heated by fluid fuel or by coal, the heating devices forming no part of the present invention. Adjacent to the retort is an air-pump 36, operated by any suitable power, a gas-engine being preferably employed. The pump is connected to a compressed-air reservoir 37, which may be supplied with a suitable safety-valve 38. From the reservoir extends a pipe 23', which is connected to the manifold 23, the latter being connected to the several retort-pipes 22, through which air is admitted to the retorts. Adjacent to the compressed-air reservoir is an

oil-tank 39, connected to the compressed-air reservoir by a pipe 40, which extends between the upper portions of both tanks, its discharge end extending downwardly within the oil-reservoir and terminating in a discharge-nozzle 41, through which a jet of air is forced into contact with the oil, or the discharge end of the air-pipe may be extended down to a point near the bottom of the tank and provided with a plurality of perforations to permit the escape of air under the oil-level. The oil-tank is connected by a pipe 42 to the manifold 19, which communicates with all of the retort-pipes 18.

With an apparatus constructed in accordance with this invention it is possible to make a continuous run for an indeterminate period of time without stopping for cleaning purposes and without the removal of any tarry or other deposits, and crude oil of any character may be employed for the purpose of manufacturing the gas.

Having thus described the invention, what I claim is—

1. In an apparatus for the manufacture of gas, an externally-heated retort formed of a number of connected superposed chambers, perforated tubes disposed within each of the chambers and extending from end to end thereof, packing of finely-divided material surrounding said tubes, air-supply pipes leading into one end of each of the chambers, air and oil supply pipes leading into the opposite ends of the chambers, thereby to form a number of volumes of gas to be intermingled by passage through said finely-divided packing material.

2. In an apparatus for the manufacture of gas, the combination with an outer casing, of a plurality of partitions arranged within the casing and having passages arranged alternately at opposite ends of the casing to provide a tortuous passage for the gas, perforated tubes arranged in the several chambers formed by the partitions, a packing of fibrous material, extending around the several tubes, and means for admitting air and oil within the tubes.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

ROBERT DEMPSTER.

Witnesses:

WM. A. PLACE,
W. S. HANCOCK.