G. CONSTANTINESCU.

VAPOR GENERATOR.

APPLICATION FILED MAR. 30, 1912.

1,032,532.

Patented July 16, 1912.

2 SHEETS—SHEET 1.

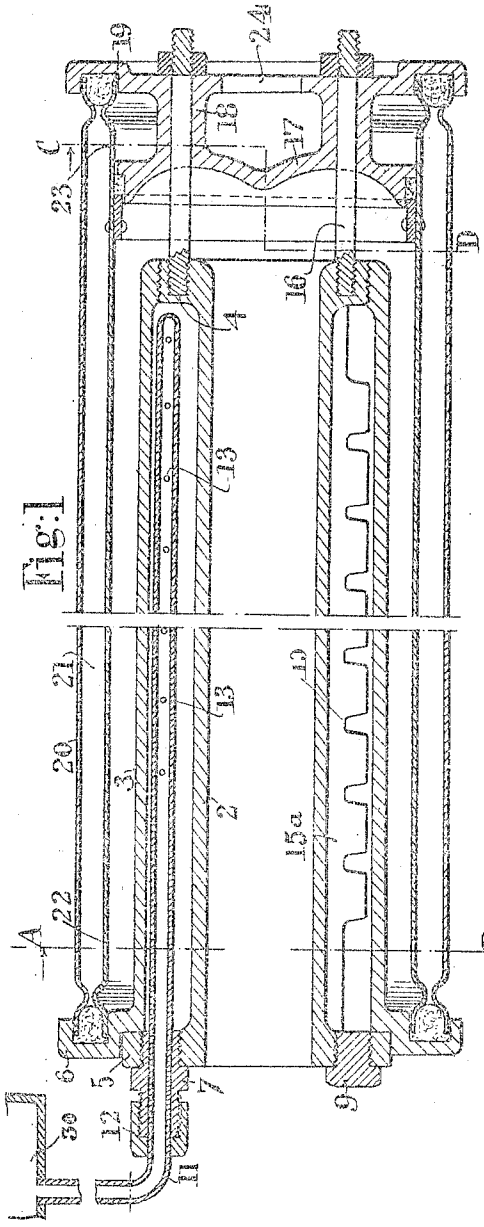

Fig. 1.

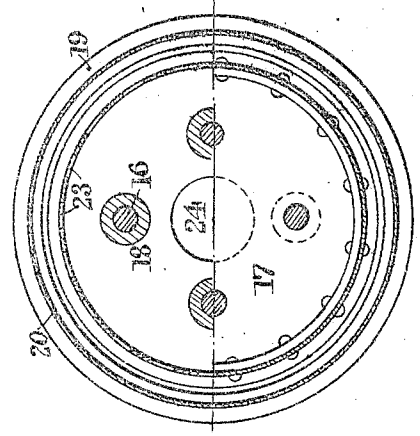

Fig. 4.

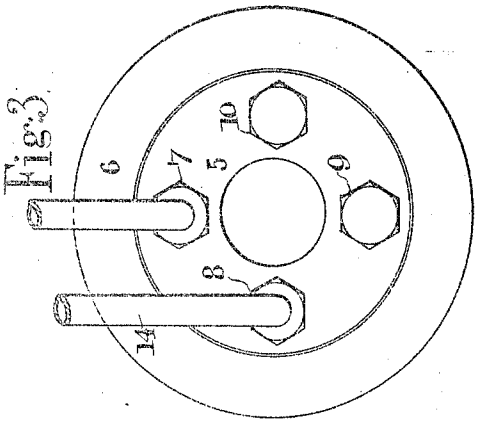

Fig. 3.

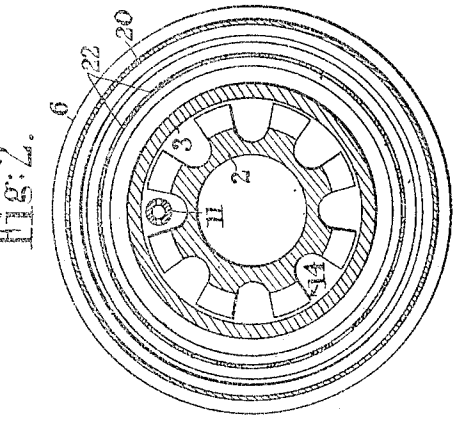

Fig. 2.

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2 SHEETS—SHEET 2.

Fig:6

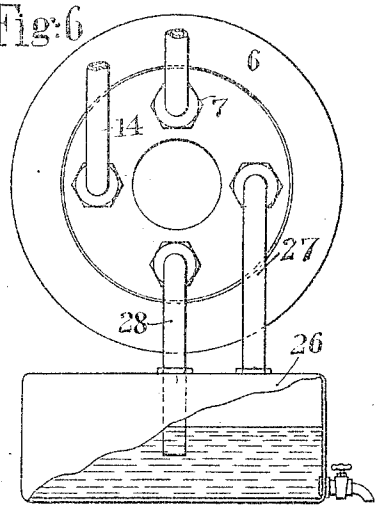
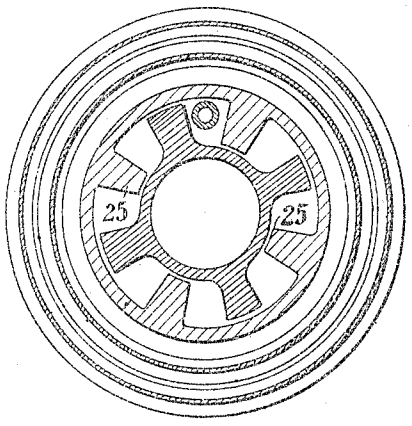



Fig:5

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# UNITED STATES PATENT OFFICE.

GOGU CONSTANTINESCU, OF LONDON, ENGLAND.

## VAPOR-GENERATOR.

1,032,532. Specification of Letters Patent. Patented July 16, 1912.

Application filed March 30, 1912. Serial No. 687,391.

*To all whom it may concern:*

Be it known that I, GOGU CONSTANTINESCU, a subject of the King of Roumania, residing at London, in England, have invented a certain new and useful Improved Vapor-Generator, of which the following is a specification.

This invention relates to generators of the surface or "flash" type, adapted for generating steam, and also for converting, into vapor, liquids other than water, for example liquid hydro-carbon for carbureting purposes.

The object of the invention is to provide a simple and compact apparatus of this type, having the advantage, among others, of being easy to build up and take to pieces, and also the advantage of a liquid-feed which is automatically regulated according to the requirements of the steam or vapor consuming apparatus.

It is an essential feature of the present invention that there is no access of air to the chamber, the liquid being fed into the chamber against the pressure of the generated vapor, and if the invention is applied to air carbureting purposes, the vapor generated must be mixed with the air outside the generating chamber.

One form of construction of the improved vapor generator, is illustrated in the accompanying drawing, in which:—

Figure 1 is a longitudinal section of the apparatus, with the central part broken away. Fig. 2 is an end elevation, viewed from the left hand side of Fig. 1, and Figs. 3 and 4 are sections on the lines A—B and C—D respectively of Fig. 1. Fig. 5 is a section corresponding to that in Fig. 3, but illustrating a modification. Fig. 6 is an end view, showing the vaporizer connected to a tank for the reception of non-vaporizable constituents of the liquid fed to the vaporizing chamber.

In the drawing 2 represents the inner cylinder and 3 the outer cylinder, forming walls of an annular chamber, the cylinder 2 having at its right hand end a flange 4 by means of which it is screwed into the cylinder 3. At its left hand end the cylinder 2 has a flange 5 forming a seat for the cylinder 3, the latter having at this end a flange 6 bent to conform to the flange 5. The flanges 4 and 5 form the end walls of the annular generating chamber between the cylinders 2 and 3. This generating chamber can be heated by motor exhaust gases or furnace gases passing through the cylinder 2, or a burner or furnace may be placed in the said cylinder 2.

The flange 5 has four holes into which are screwed plugs 7, 8, 9, 10. The plug 7 has a central bore through which a pipe 11 passes into the upper part of the annular chamber, the joint being made tight by a nut 12 screwed on to a projection of the plug. The pipe 11 is connected to a feed tank 30 located above the generator and is closed at its right hand end, near the flange 4, and has lateral holes 13. This pipe 11 is the feed pipe through which liquid is supplied to the annular chamber, the said liquid issuing through the holes 13. An eduction pipe 14, for the vapor generated, passes through the plug 8 into the annular chamber. The hole into which the plug 10 is screwed enables a second eduction pipe to be joined to the generator, if required. The hole closed by the plug 9 serves for the removal of mud or other non-vaporized matter, for instance the heavier constituents of a crude liquid hydrocarbon.

The cylinder 2 has longitudinal ribs 15 of such height as to nearly make contact with the cylinder 3. These ribs may, in fact, be made larger than illustrated, so as to make contact with the outer cylinder and absorb heat from the same, the outer cylinder being heated in a manner which will be described hereinafter. The ribs 15 have notches $15^a$, and the notches in the several parallel ribs are preferably disposed in staggered relation to each other; this can conveniently be done by cutting the notches by means of a helical cutting operation, performed around the circumference of the cylinder. The ribs 15 serve as accumulators of heat, against which the liquid impinges, the notches $15^a$ enabling such liquid as is not directly flashed into vapor to pass freely down the sides of the chamber, over highly heated evaporating surfaces.

The feed is to a large extent automatically regulated in accordance with the requirements of the engine or other apparatus served with the vapor, inasmuch as the pressure in the generating chamber, vary-

ing with the said requirements, automatically regulates the flow of liquid from the holes 13.

Bolts 16 screwed into the flange 4 support a cover or head 17 some distance from the said flange. The bolts pass through bosses 18 which are integral with the head 17 and support a flange 19. The latter and the flange 6 have channels forming bearings for the ends of two cylinders 20 and 21 concentric with the cylinders 2 and 3, the joints between the said flanges and cylinders 20, 21 being made tight by means of packing. A tight joint is also made between the head 17 and the cylinder 21. The cylinder 21 has holes 22 near the flange 6, and holes 23 outside the head 17, so that heating gases issuing from the right hand end of the cylinder 2 are compelled to take a zigzag course through the cylinders 21, 20 before they can pass out of the apparatus through the orifice 24 surrounded by the flange 19. The cover head has an annular depression, as shown in section in Fig. 1, affording a concave surface where the heating gases strike it, so that the said gases, issuing from the cylinder 2, are deflected into the cylinder 21 with a minimum of obstruction by eddy action.

In the modification shown in Fig. 5, inwardly projecting ribs 25 on the outer cylinder of the generating chamber alternate with ribs on the inner cylinder. In this case the inner cylinder is not rotatable in the outer cylinder, and cannot be directly screwed into the same. The joint between the cylinders is accordingly made by other suitable means.

In the construction shown in Fig. 6 a tank 26 provided with a cock is connected to the vaporizing chamber by pipes 27, 28, the connections being made at the holes which, in the arrangement shown in Figs. 1 and 3, are closed by plugs 9 and 10. The tank serves for the reception of non-vaporizable constituents of the liquid, which can be drawn off from time to time.

I prefer to construct the inner cylinder 2 of cast iron, except in designs of small pattern where copper or the like may be more convenient. The outer cylinder 3 is also preferably of cast iron, but may be of copper or the like. The cylinders 20 and 21 may be of copper or other sheet metal.

It is not essential that the heat absorbing bodies in the generating chamber are integral with a wall or walls of the said chamber. Loose bodies may be inserted, but I prefer to have them integral in cases where a sediment occurs, rendering occasional cleaning necessary; in such cases it is convenient to be able to bodily withdraw the heat absorbing bodies, for cleaning purposes, together with the cylindrical walls of the generating chamber.

What I claim as my invention and desire to secure by Letters Patent of the United States is:—

1. A vapor generator comprising an annular chamber closed to the atmosphere and having two horizontal cylindrical walls, massive heat-conducting bodies disposed in said chamber, a horizontal feed pipe in the upper part of said chamber, with perforations distributed along its length, and means for feeding liquid under pressure through said perforated pipe into said chamber.

2. A vapor generator comprising an annular chamber closed to the atmosphere and having two horizontal cylindrical walls, massive heat-conducting bodies disposed in said chamber, a horizontal feed pipe in the upper part of said chamber, with perforations distributed along its length, and means for feeding liquid under pressure through said perforated pipe into said chamber, said heat-conducting bodies being integral with the chamber walls.

3. A vapor generator comprising an annular chamber closed to the atmosphere and having two horizontal cylindrical walls, massive heat-conducting bodies disposed in said chamber, a horizontal feed pipe in the upper part of said chamber, with perforations distributed along its length, and means for feeding liquid under pressure through said perforated pipe into said chamber, said heat conducting bodies being notched, longitudinal ribs formed alternately on the inner and outer cylindrical wall of the chamber.

4. A vapor generator comprising an annular chamber closed to the atmosphere and having two horizontal cylindrical walls, massive heat-conducting bodies disposed in said chamber, a horizontal feed pipe in the upper part of said chamber, with perforations distributed along its length, means for feeding liquid under pressure through said perforated pipe into said chamber, an external flange at one end of the outer cylindrical wall of said chamber, two eccentric cylinders surrounding said chamber and abutting at one end against said flange, the inner surrounding cylinder having perforations near its ends, a head fitted into the inner surrounding cylinder between one end of the generating chamber and the holes at the corresponding end of the inner surrounding cylinder, bolts connecting said head to the generating chamber, and a flange formed on said head to engage the adjacent ends of the two surrounding cylinders.

5. A vapor generator comprising an annular chamber closed to the atmosphere and having two horizontal cylindrical walls, massive heat-conducting bodies disposed in said chamber, a horizontal feed pipe in the upper part of said chamber, with perfora-

tions distributed along its length, means for feeding liquid under pressure through said perforated pipe into said chamber, a tank below said annular chamber, closed to the atmosphere, a pipe connecting said tank to the lower part of the annular chamber, and a pipe connecting said tank to the upper part of said chamber.

In witness whereof I have signed this specification in the presence of two witnesses.

GOGU CONSTANTINESCU.

Witnesses:
S. FORD,
H. D. JAMESON.