H. PARZELLER.

COMPRESSED GAS GENERATOR.

APPLICATION FILED NOV. 2, 1908.

989,923.

Patented Apr. 18, 1911.

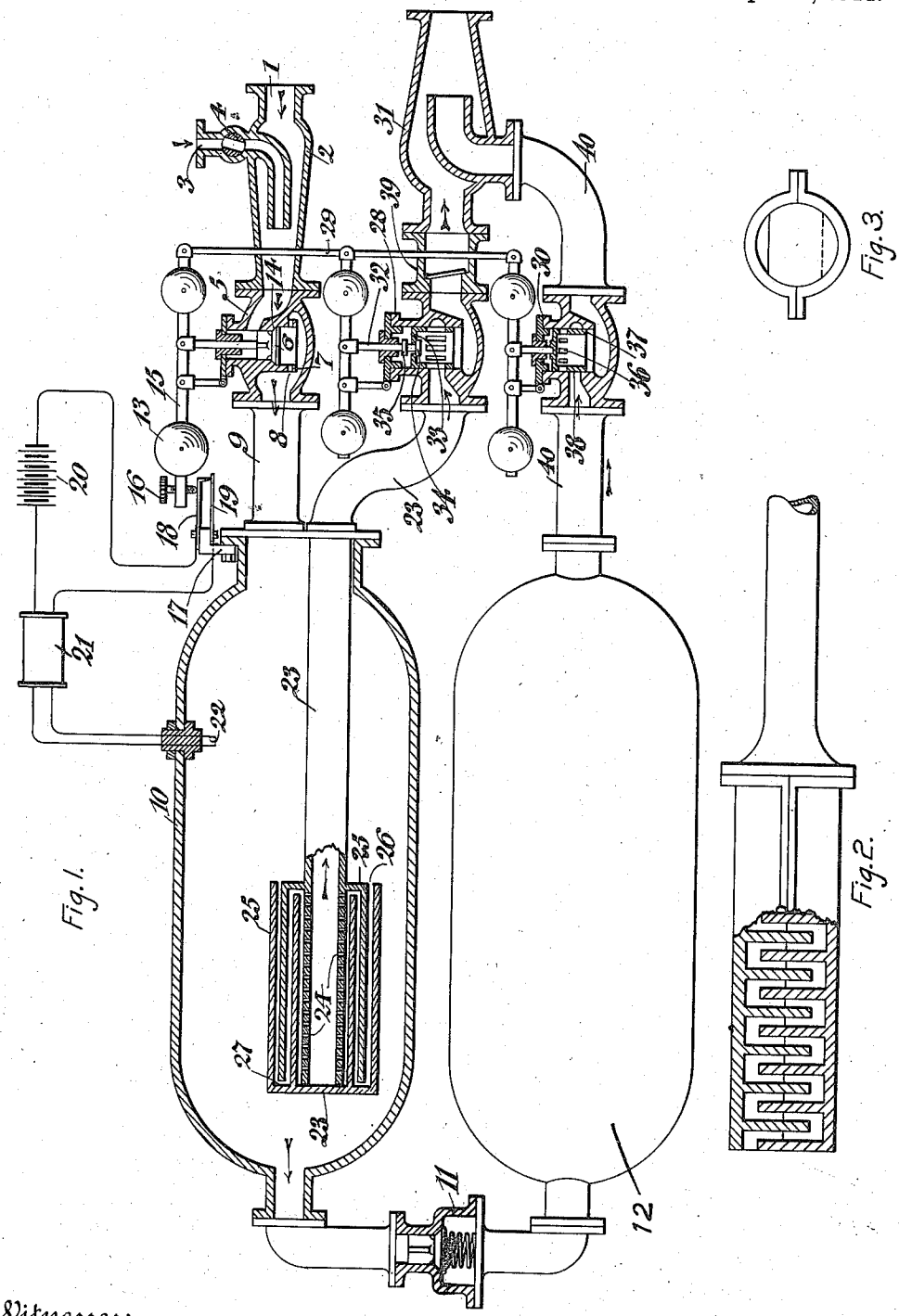


Fig. 1.



Fig. 2.



Fig. 3.

Witnesses:
Wm. J. Chipman
Fannie Fish

Inventor
Heinrich Parzeller
By his Attorneys Gould & Goepel.

# UNITED STATES PATENT OFFICE.

HEINRICH PARZELLER, OF ESSEN-ON-THE-RUHR, GERMANY.

## COMPRESSED-GAS GENERATOR.

989,923. Specification of Letters Patent. Patented Apr. 18, 1911.

Application filed November 2, 1908. Serial No. 460,672.

*To all whom it may concern:*

Be it known that I, HEINRICH PARZELLER, a subject of the German Emperor, and residing at Essen-on-the-Ruhr, Germany, have invented certain new and useful Improvements in Compressed-Gas Generators, of which the following is a specification.

The subject-matter of the present invention is a device which, employing a mixture of atmospheric air with aeriform gases or gasified liquid fuels, supplies an uninterrupted current of gases under pressure for driving prime movers, turbines, and the like.

In order that the invention may be clearly understood reference will be made to the accompanying drawing in which embodiments are represented diagrammatically by way of example, and in which—

Figure 1 is an elevation, partly in section, showing the general arrangement of a compressed gas generator, whereas Figs. 2 and 3 are side elevation, partly in section, and end elevation, respectively, of a modified form of part of the device shown in Fig. 1.

The manner in which the plant operates is as follows: Compressed air at a certain tension flows at 1 into the mixing nozzle 2 where the air mixes with the gas or combustible vapor which enters at 3 and the flow of which can be regulated by the stop-cock 4, whereupon the gaseous mixture flowing through the admission valve 5 presses down the piston 6 of the latter to the point 7 and passes through the orifice 8 in the valve-box and through the pipe 9 into the explosion chamber 10. The load on the relief valve 11, which connects the chamber 10 with the storage receptacle 12, is so proportioned that it does not normally give way to the pressure of the gaseous mixture to which it is exposed and no more gas flows into the storage receptacle 12. Now as soon as the mixture in the combustion chamber 10 has become compressed to the tension of the compressed air entering at 1, and consequently the latter is no longer at an excess pressure, the admission valve 5 closes automatically, the valve piston 6 being raised onto its seat 14 in consequence of the diminishing pressure from 1 and on account of the action of the weight 13 on the lever 15 with which the piston 6 is connected. At this moment the set-screw 16 which is arranged adjustably on the extreme end of the lever arm 15 directed toward the explosion chamber 10 contacts with the upper contact spring 18 of the two contact springs 18 and 19 attached on the piece of insulation 17, so that the circuit of the battery 20 is closed by way of an ignition coil 21 and a spark jumps across at 22 in the chamber 10 and ignites the mixture of gases. Under the pressure of the exploded gases the relief valve 11 opens and allows a portion of the gases in chamber 10 to flow into the storage receptacle 12 until the same pressure exists in this as in the chamber 10, whereupon the valve 11 closes automatically. Since the direct force of the explosion would destroy the turbine, prime mover, or the like, and the devices connected in front of it, the one end of the pipe 23 which conducts the gases into the engine is closed, but the sides of the pipe are provided instead with many fine holes 24; these together correspond in area to the clear diameter of the pipe and are covered by muffs 25 which are arranged one over another or concentrically with spaces left between them. The first blow of the gaseous mixture which explodes with great violence and which enters this checking device at 26 is received by the interior end face 27 of the exterior muff, and in addition the current of gas is sent several times to and fro parallel to its direction of motion and its living force is for the most part dissipated. From the innermost muff the current of gas passes through the fine holes 24, in which it is throttled considerably more, into the interior of the pipe 23 and on through the outlet valve 28, relief valve 39 and the nozzle 31 into the engine, turbine, or the like. When, at last, the expanded gas inclosed in the explosion chamber 10 is consumed to such an extent that the tension sinks below the driving pressure of the engine or turbine, the piston 6 of the admission valve 5 at the explosion chamber begins to descend in consequence of the diminishing tension in chamber 10 and the pressure acting from 1, and at once opens the outlet or discharge valve 30 at the storage receptacle 12 which is positively connected by the rod 29 with the lever arm 15 of valve 5, whereas the outlet valve 28, which is also connected by the rod 29 with the valve 5, remains open for a short time by virtue of its arrangement which is more particularly described hereafter and is closed only after the valve 5 for admitting the gaseous mixture has been completely opened.

The purpose of the outlet valve 28 of the

explosion chamber remaining open after the like device 30 at the storage receptacle has been opened is that, by means of the current of gas which flows out of the latter receptacle into the injector-like part 31 of the pipe 23 or 40, the residues of gas after the explosion which are still in the explosion chamber may be carried away in consequence of the suction action of the current of gas, and thus purify the chamber, and simultaneously a certain reduced pressure is produced in it which makes it suitable for receiving a fresh supply of the gaseous mixture. This is made possible because the piston-rod 32 of the outlet valve 28 is not connected firmly with the hollow valve-piston 33, but fits tightly and is movable in the upper end of the piston 33 which is driven by the collars 34 and 35 into its highest and lowest positions. In the position of the valves represented in the drawing, as soon as the piston 6 of the valve 5 begins to descend under the pressure of the entering mixture of gases, the valve 30 which is connected with the valve 5 by the rod 29 is at once opened, the slots 36 in its hollow piston 37 being brought into agreement with the corresponding annular opening 38 in the body of the valve. In the meantime, however, the piston 33 of the valve 28 remains stationary for the present on account of friction in the position in which it is shown and is depressed only when the collar 35 arrives onto the upper face of the piston 33 when the flow of the gas is interrupted. In order to prevent gas returning during this operation from the pipe 23 or 40 into the explosion chamber, an additional relief valve 39, a clack valve, is arranged in the former pipe behind the outlet valve 28. As long as the valve 30 is open, the inlet valve 5 being not yet quite open on the contrary, or the outlet valve 28 not yet quite closed, the quantity of exploded gas inclosed in the storage receptacle 12 flows through the injector-like device into the prime mover or turbine, taking with it simultaneously any residues of gas which are still in the explosion chamber. In this manner, however, a certain reduced pressure is produced as compared with that of the mixture which flows in afresh from 8; the chamber 10 fills again with explosive mixture and the above described working cycle is repeated and takes place in the like manner. Consequently the above described plant supplies an uninterrupted current of gas which now flowing into the explosion chamber 10 and now into the storage receptacle 12 is conducted through the injector-like nozzle 31 into the engine or turbine and is here used for doing work.

The throttling device shown in Fig. 1 in chamber 10 at the end of pipe 23 may also be constructed in various other ways. For example it may be made in the manner of labyrinth packing or a corrugated bearing, as shown in Figs. 2 and 3, or a part of the pipe 23 may be bent or wound without altering its clear cross-sectional area in very different forms, such as spiral, serpentine, zigzag, triangular and other shapes, for weakening the blow of the explosion and doing away with injurious action on the engine or turbine and the members connected in front of the latter, without departing from the spirit and scope of the invention.

What I claim as my invention and desire to secure by Letters Patent is:

1. A gas-generator comprising an explosion-chamber, a storage-receptacle communicating therewith, a relief-valve interposed between said chamber and said receptacle, and separate means for conducting the exploded gases respectively from said receptacle and from said chamber.

2. A gas-generator comprising an explosion-chamber, a storage-receptacle communicating therewith, a relief-valve interposed between said chamber and said receptacle, an admission-valve for the explosion-chamber, a sparking device in said explosion-chamber and adapted to be rendered operative by the movement of said admission-valve, and means for conducting the exploded gases from said chamber and receptacle.

3. A gas-generator comprising an explosion-chamber, an inlet-pipe for conducting an explosive mixture to the explosion-chamber, an admission-valve in said pipe, a sparking device in said explosion-chamber, and an operative connection between said valve and said sparking device whereby said device is caused to spark when said valve is closed.

4. A gas-generator comprising an explosion-chamber, a sparking device in said explosion-chamber, an admission-valve for introducing an explosive mixture into said chamber, and automatic means for causing said sparking device to spark when said valve is closed.

5. A gas-generator comprising an explosion-chamber, means for introducing an explosive mixture into said chamber, means for causing said explosive mixture to be exploded, an outlet-pipe leading from said explosion-chamber, a checking device at the inner end of the outlet-pipe, a storage receptacle, a pipe connecting the receptacle with said chamber, and an additional outlet-pipe leading from the receptacle.

6. A gas-generator comprising an explosion-chamber, a storage-receptacle communicating therewith, an admission-valve for introducing an explosive mixture into said explosion-chamber, an outlet-valve for said explosion-chamber, a discharge-valve for said receptacle, an operative connection between all of said valves, and means for ig-

niting the mixture in the explosion-chamber.

7. A gas-generator comprising an explosion-chamber, a storage-receptacle having communication therewith, an outlet-pipe leading from said explosion-chamber, and a discharge-pipe communicating with said storage-receptacle and an injector-like part in said outlet-pipe and communicating with the discharge-pipe.

8. A gas-generator comprising an explosion-chamber, a storage-receptacle communicating therewith, a relief-valve interposed between said chamber and receptacle, an inlet-pipe for conducting an explosive mixture to the explosion-chamber, an admission-valve in said inlet-pipe, an outlet-pipe leading from said explosion-chamber, an outlet-valve in said outlet-pipe, a checking device at the inner end of the outlet-pipe, a discharge-pipe communicating with said storage-receptacle and terminating in an injector-like part in said outlet-pipe, a discharge-valve in said discharge-pipe, a positive connection between the movable parts of the three valves, a sparking device in the explosion-chamber, and means connected with the admission-valve for operating the sparking device.

9. In a gas-generator, an explosion-chamber having an outlet-pipe terminating therein, said pipe being provided with perforations at its inner end, and overlapping muffs surrounding said end and said perforations.

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

HEINRICH PARZELLER. [L. S.]

Witnesses:

OTTO KÖNIG,

WALTER O. SHELLCHAMP.