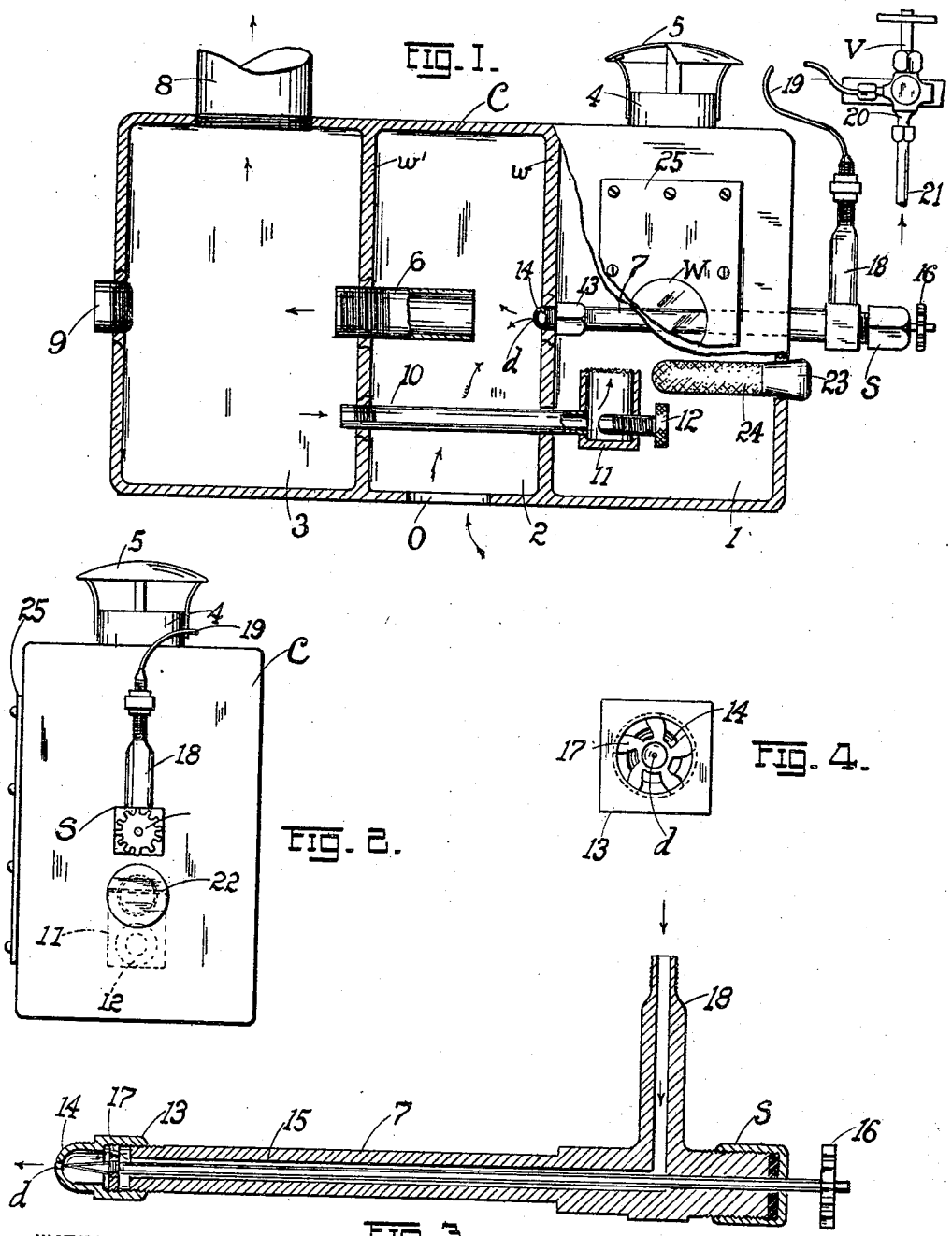


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 VAPOUR GENERATOR.  
 APPLICATION FILED AUG. 7, 1909.

968,629.

Patented Aug. 30, 1910.



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# UNITED STATES PATENT OFFICE.

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## VAPOR-GENERATOR.

968,629.

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

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*To all whom it may concern:*

Be it known that I, RICHARD W. ZIERLEIN, citizen of the United States, residing at St. Louis, State of Missouri, have invented certain new and useful Improvements in Vapor-Generators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part hereof.

My invention has relation to improvements in vapor generators; and it consists in the novel details of construction more fully set forth in the specification and pointed out in the claims.

In the drawings, Figure 1 is a side elevation of the casing of the generator with wall partly removed, parts being in section, and other parts in side elevation; Fig. 2 is an end elevation of the casing; Fig. 3 is a middle longitudinal section of the generator pipe; and Fig. 4 is an end view of the socket carried by the generator pipe, detached.

The object of my invention is to construct a vapor generator, which will dispense with the prevailing oil or alcohol cup for producing the starting flame by which the walls of the generator-pipe or tube are initially heated to vaporize the first portion of the hydrocarbon, my invention substituting therefor a supplemental burner which itself is started from the flame of an igniting plug temporarily inserted into the chamber surrounding the generator pipe, which plug may be left in place after the generator is once started.

A further object is to produce a generator which will be extremely simple, cheap and durable; one in which the generator pipe is provided with special means for controlling the position of the needle of the feed-valve; one possessing a storage compartment from which the supply of the mixed gases may be conducted to any available point of consumption; and one possessing further and other advantages better apparent from a detailed description of the invention which is as follows:—

Referring to the drawings, C, represents a casing preferably oblong as shown (though I do not wish to confine myself to any particular shape) divided off by transverse par-

tition walls *w, w'* into contiguous compartments or chambers 1, 2, 3, respectively. The compartment 1 constitutes the burner-compartment being provided with a top escape-flue 4 surmounted by a protecting hood 5 of any suitable construction. Screwed in the wall separating the compartments 2 and 3 is a conducting tube 6 which conveys the mixture of vapor and air from the compartment 2 to the compartment 3. The compartment 2 constitutes a mixing chamber, air being freely admitted therein through the bottom opening 0, and mixing with the vapor projected into said compartment toward said tube 6 from the discharge port *d* of the generator-pipe 7 to be presently referred to. The compartment 3 is in the nature of a storage chamber, the mixture being conducted therefrom through a pipe connection 8 tapping the walls of the compartment at any convenient point, to any suitable point of consumption. The end wall of the compartment 3 is provided with a swab-opening normally closed by a screw-plug 9, opposite the tube 6, and when occasion arises to clean the tube, the plug is removed, a swab inserted through the opening and passed into the tube 6 as clearly obvious from the drawing. Passed through the partitions *w, w'* and screwed into the partition *w'* is a return tube 10 which terminates in the compartment 1 in a burner-head 11 to which the quantity of mixture supplied thereto by the tube 10 is regulated by a screw-valve 12, the valve showing the discharge end of the tube 10 fully uncovered (Fig. 1). The burner 11 furnishes the flame for heating the walls of the generator-pipe 7 to be now described. This pipe, as also the tube 6 is disposed longitudinally of the generator casing C and substantially along the medial axis thereof. The inner end of the generator pipe 7 is provided with a detachable screw-socket 13 which terminates in a nozzle 14 exteriorly screw-threaded, the pipe being secured to the wall *w* by screwing the nozzle 14 into and through it so as to discharge into the mixing chamber 2, the depth of insertion of the nozzle into the wall *w* being limited by the shoulder formed by the socket 13. The pipe 7 is pro-

vided with a screw-valve stem 15 passing through a stuffing box S, at the outer end of the pipe, and terminating in a hand-wheel or star-disk 16 by which the valve may be actuated. The inner end of the valve-stem terminates in a needle point which operates in the passage or port *d* of the nozzle 14 carried by the socket 13, the precise position of the needle in the nozzle being regulated by a spider 17. The center of the spider is provided with a threaded opening in which operates the inner screw-threaded portion of the valve-stem, and when the stem has been screwed to the limit of the screw-threaded portion, the spider arrests further movement of the valve inwardly. The degree of available passage-way around the needle may be carefully regulated by adjusting the position of the spider within the socket 13, the outer ends of the spider arms being screw-threaded so that the spider may be screwed into the socket to any desirable depth. The gas flows from the generator pipe between the arms or lobes of the spider into the passage around the needle valve and out through the port *d* into the mixing chamber. The pipe 7 is provided just outside the casing C with a hollow arm 18 to which is attached one end of a wire tube 19, the opposite end of which connects with the discharge end of the casing of a supply cock or valve V, having a leg 20 to which is attached a pipe 21 leading to any suitable hydro-carbon supply tank (not shown) the fuel being generally forced to the valve under pressure as understood in the art. The supply-cock V may be of any convenient construction.

Formed in the end wall of the compartment 1 is an opening normally closed by a plug 22, which on removal permits the insertion therein of a cork 23 to which is attached an asbestos or mineral wool sponge or stem 24 saturated with alcohol which is previously ignited, and used to start the generator. The cork or plug 23 may be used to close the mouth of a bottle containing the alcohol, and by shaking the bottle, the contents will come in contact with the sponge or stem 24 and sufficient quantity be absorbed thereby to start the generator.

The operation is as follows:—The plug 23 with its saturated sponge is inserted, (Fig. 1,) a lighted match having been previously applied to the same, the flame from the sponge heating the walls of the generator pipe 7. The hydro-carbon is then admitted therein by opening the cock V, and as it enters the pipe 7 it vaporizes, the vapors being projected into the mixing chamber 2. The projection of the vapors induces a flow of air into the chamber 2 through the opening 0, and the gases now mixed jointly flow through the conducting tube 6 into the storage chamber 3, whence

they are conducted to any suitable point of consumption through the pipe connection 8. A part of the mixture is shunted back through the tube 10 into the burner 11 where it ignites from the flame of the sponge or torch 24, the amount of the gas admitted to the burner being carefully regulated by the valve 12. The burner flame after that furnishes the necessary heat to the walls of the generator 7 to vaporize the hydro-carbon flowing through the same on its way to the port *d* of discharge nozzle 14. The products of combustion from the flames in compartment 1 escape through the flue 4.

It will be seen from the foregoing that the generator here shown and described may be regulated with the greatest nicety, and that it is susceptible of a variety of modifications as to form and details.

In the present casing a section of the side wall of the burner compartment 1 is covered by a removable plate 25 provided with a transparent window W through which the operations of the flames may be observed.

Having described my invention, what I claim is:—

1. A vapor generator comprising a casing provided respectively with a burner chamber, a mixing chamber and storage chamber, means for conducting the vapors and air into the mixing chamber, and from the mixing chamber into the storage chamber, a burner in the burner-chamber, means for conducting a portion of the mixture from the storage chamber to the burner, and a generator in the burner chamber heated by the burner and delivering its vapors to the mixing chamber.

2. A vapor generator comprising a casing provided with a burner chamber, a generator pipe disposed longitudinally thereof, means for supplying said pipe with hydro-carbon, a mixing chamber adjacent to the burner chamber into which the generator pipe discharges, a storage chamber for the mixture, and means for shunting a portion of the mixture from the storage chamber and burning the same in the burner-chamber for heating the walls of the generator pipe.

3. A vapor-generator comprising a casing provided with a burner-chamber, a mixing chamber and a storage chamber in contiguous relation, a generator pipe disposed across the burner chamber and discharging into the mixing chamber through the wall separating the two chambers, the mixing chamber having a suitable air-intake opening, a conducting pipe mounted in the wall separating the mixing from the storage chamber and positioned opposite the point of discharge from the generator pipe, the storage chamber having an outlet for the mixed gases, and a return tube leading from

the storage chamber to the burner chamber and terminating in a burner in the burner chamber.

5 4. A vapor generator, comprising a casing having contiguous burner, mixing and storage chambers, a conducting pipe leading from the mixing to the storage chamber, the latter being provided with an opening op-

posite the pipe for inserting a swab for purposes of cleaning the same.

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

RICHARD W. ZIERLEIN.

Witnesses:

EMIL STAREK,  
JOS. A. MICHEL.