Oct. 26, 1926. 1,604,702

J. B. LUPHER

STEAM GENERATOR FOR INTERNAL COMBUSTION ENGINES

Filed August 27, 1925

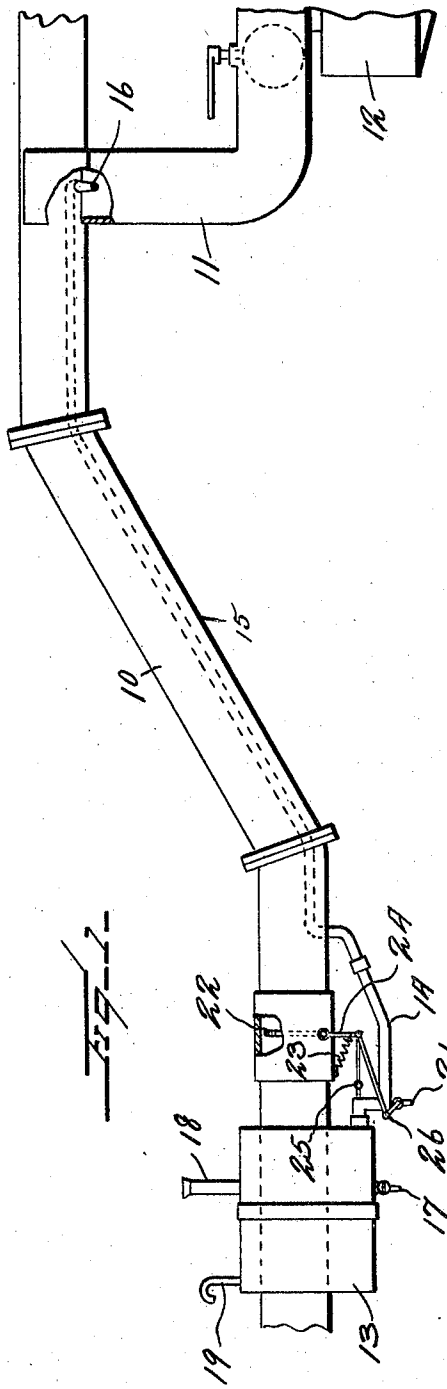


Fig. 2.

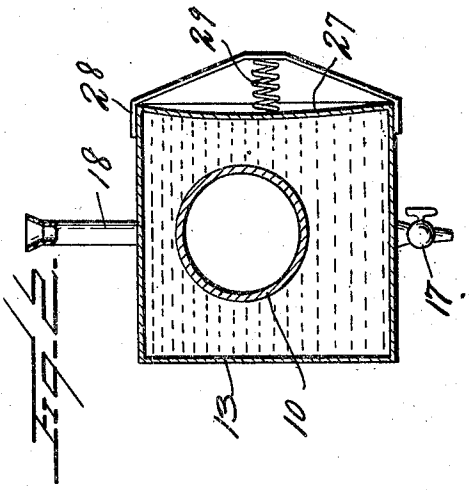


Fig. 3.

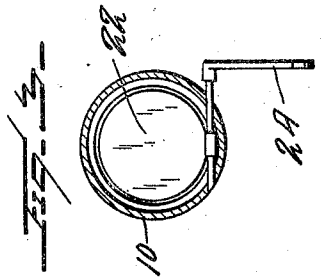
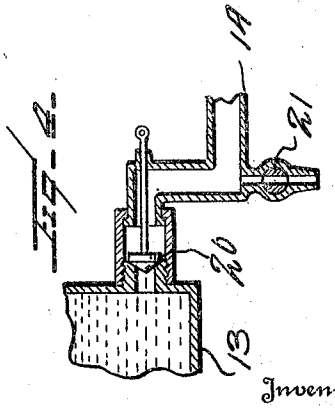


Fig. 4.



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UNITED STATES PATENT OFFICE.

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STEAM GENERATOR FOR INTERNAL-COMBUSTION ENGINES.

Application filed August 27, 1925. Serial No. 52,947.

This invention relates to steam generators for internal combustion engines and more particularly to a means for providing steam for admission to the intake of a carbureter to assist in volatilization of the fuel employed to thereby provide a more perfect mixture for the engine.

An important object of the invention is to provide a device of this character having means preventing freezing of the water employed for generating steam.

It is well known to those familiar with the art that devices of this character, when employed in winter time, are the cause of considerable trouble in that the liquid contents of the container freeze, often breaking the container and thus destroying the device or portions of the tubing, employed for conducting the steam to the carbureter and having collected water therein, are broken by freezing of the water contained. Accordingly, a more specific object of the invention is to provide means for relieving the pressure caused by freezing of the contents of the storage container and provide means automatically draining the conducting tube when the engine is stopped.

These and other objects I attain by the construction shown in the accompanying drawing, wherein for the purpose of illustration is shown a preferred embodiment of my invention and wherein:—

Figure 1 is a side elevation partially broken away showing a steam generator for internal combustion engines constructed in accordance with my invention;

Figure 2 is a sectional view through the container;

Figure 3 is a view of the control element for permitting passage of water from the container;

Figure 4 is a detail sectional view showing the relative positions of the valves 20 and 21 when the engine is not operating.

Referring now more particularly to the drawing, the numeral 10 indicates the exhaust pipe of an engine and 11 the intake pipe of a carbureter 12. In accordance with my invention, the exhaust pipe is provided with a water container 13 which is arranged in surrounding relation to the exhaust pipe and at a point spaced upon the exhaust pipe from the point of contact of the intake pipe 11 of the carbureter 12 with the exhaust pipe or manifold. This container 13 has leading from the lower portion thereof a conduit 14 which is extended along and secured to the exhaust pipe, as at 15, and has its terminal portion 16 directed into the mouth of the carbureter intake pipe 11 to discharge steam therein. In the present illustration, substantially the full length of the conduit 14 is shown as disposed within the exhaust pipe.

The container 13 has a drain plug 17 at its bottom by means of which its contents may be removed when the vehicle is to be allowed to set without using it for some time. This container is further provided with a filling opening 18 and an overflow pipe 19 controlling the height of liquid within the container.

At the connection of the conduit 14 with the container, a valve 20 is provided for controlling the passage of fluid from the container to the conduit and this conduit at its lowest point has a drain valve 21 by means of which the conduit may be drained. These valves 20 and 21 are arranged adjacent one another and within the exhaust pipe immediately adjacent the container 13, a flap valve 22 is arranged. This flap valve is shifted by exhaust gases passing through the manifold 10 against the action of a spring 23 and by its shifting operates a lever 24 connected with the valve 20, as at 25, and having a detachable connection with the valve 21, as at 26. These connections are such that as the valve 22 is moved under the influence of the exhaust gases, the valve 20 is opened and the valve 21 closed. When the valve 22 returns to its normal position under the influence of the spring, as the passage of exhaust gases stops, the valve 20 is closed and the valve 21 is opened.

It will thus be seen that when the engine is stopped, the conduit 14 is thrown out of communication with the storage tank and the drain valve of this conduit is opened. It will be obvious that in winter time, this will prevent freezing of liquid within the conduit 14 and consequent destruction of the conduit since it automatically drains the conduit. In summer, the detachable connection 26 may be removed so as to prevent useless waste of water.

In order to prevent destruction of the tank or container 13 by freezing thereof, one side wall of the container is formed of resilient material and is normally inwardly bowed, as indicated at 27. To the top and bottom walls of the container are connected

the ends of a strap 28 extending over this side wall centrally thereof and between the central portion of the strap 28 and the side wall a spring 29 is disposed to urge the side wall inwardly. It will be obvious that if the contents of the container freeze, the excess pressure will cause the side wall to move outwardly against the action of the spring, increasing the size of the container and preventing breaking thereof but as soon as this pressure is relieved, the spring will return the side wall to its normal position. It will thus be obvious that means are provided for absolutely preventing destruction of the steam generated by freezing, thus enabling the use of the steam generator at that time when its use is most particularly to be desired. The advantages of admitting steam at the intake of the carbureter are, of course, well known to those familiar with the art.

Since the construction hereinbefore set forth is capable of a certain range of change and modification without materially departing from the spirit of my invention, I do not limit myself to such specific structure except as hereinafter claimed.

I claim:—

1. In combination with an internal combustion engine including an exhaust pipe, a liquid container associated with the exhaust pipe to be heated thereby, a conduit conducting steam from the container to the engine, means for draining said conduit, means for controlling communication between the conduit and container and means operated by the exhaust pressure for closing the first named means and opening the last named means.

2. In a steam generator for internal combustion engines, a reservoir for water to be heated having an expansible end to compensate for excess pressure formed within the container, a conduit associated with the tank, a valve controlling communication between the tank and conduit, a second valve in the conduit and normally opened to drain the conduit and exhaust operated means for opening the first named valve and closing the last named valve.

3. In a steam generator for internal combustion engines, a reservoir, a conduit subjected to the heat of the exhaust of the engine, means controlling communication between the reservoir and conduit, means for draining the conduit and means controlled by the exhaust pressure of an internal combustion engine for closing said drain and opening communication between the reservoir and conduit.

In testimony whereof I hereunto affix my signature.

JAY B. LUPHER.