



**United States Patent and Trademark Office**

[Home](#) | [Site Index](#) | [Search](#) | [FAQ](#) | [Glossary](#) | [Guides](#) | [Contacts](#) | [eBusiness](#) | [eBiz alerts](#) | [News](#) | [Help](#)

Publication Number: 02311199

Section: Front Page 2 of 4 pages

[Help](#)

[▲ Full Text](#)  
[? Help](#)

**Go to Page:**

 

**Sections:**

- Front Page**
- Drawings**
- Specifications**
- Claims**

Patented Feb. 16, 1943

2,311,199

## UNITED STATES PATENT OFFICE

2,311,199

## METHOD AND APPARATUS FOR PRODUCTION OF SMOKE OR FOG

Per Anton Åstradsson, Stockholm, Sweden, assignor to Svenska Aktiebolaget Gasaccumulator, Stockholm, Sweden, a corporation of Sweden

Application December 6, 1940, Serial No. 368,878  
In Sweden December 19, 1939

8 Claims. (Cl. 73—189)

The present invention refers to production of smoke or fog, especially for indicating wind direction, signalling or other similar purposes, by discharging easily condensable or sublimable gases or vapors into the open air. Devices of this kind, previously known, have the disadvantage that a great part of the vapors are condensed, or sublimated in the nozzle through which they are let out. This means in the first place, a reduction of the smoke producing effect, but involves also considerable disadvantages, especially when the gases or vapors, directly or indirectly, give rise to the formation of solid particles. The formation of such particles may, partly, take place directly through sublimation or congelation of liquid particles, and partly, through chemical decomposition of condensed liquid. The latter is the case when heavy mineral oils are used for the production of fog or smoke. In liquid state, these oils very easily decompose under the influence of heat, whereby solid carbon particles are segregated.

If thus an oil vapor is used for the production of fog, the vapor being let out through a nozzle, the temperature of which is lower than the dew point of the oil vapor, the oil condenses on the nozzle. The oil is then decomposed and solid carbon particles are deposited in the nozzle, which will gradually get choked. According to the present invention this disadvantage is avoided by keeping the nozzle at a temperature, which is higher than the dew point of the vapor. However, the dew point of certain oil vapors in common use lies near the ignition temperature or even higher. In such a case there is a risk of the vapor, escaping through the nozzle, being ignited.

In one utilization of the invention, the smoke producing gas or vapor is therefore, before leaving the nozzle, mixed with a dilution gas with relatively low boiling point, preferably air, whereby the dew point of the gas or the vapor is lowered. It is then possible to keep the nozzle at a lower temperature without condensation taking place, and the risk of ignition is entirely eliminated. The mixing of the gas or the vapor with dilution gas is preferably effected by the inlet of dilution gas through the nozzle taking place periodically, alternating with the outlet of gas or vapor mingled with dilution gas.

The single figure of the accompanying drawing shows diagrammatically an embodiment of the invention in the shape of a smoke producing

5 zation tube 2 is arranged. The lower end of this tube projects into an oil tank 3, placed in the bottom part of the casing 1, where the interior of the pipe communicates with the oil tank. By means of a cylinder 4 and conduits 5 and 6 the oil tank 3 is connected with a float housing or chamber 7. The supply of oil to the float chamber through a conduit 8 is regulated by means of a valve 9, which is controlled by a float 10. The float chamber 7 is situated at such a height that the oil level is in the vaporization tube 2 rises to a certain height a good way up in the vaporization tube as shown on the drawing. The cylinder 4 is situated parallel with and on the same level with the lower part of the vaporization tube. A piston 11 is arranged to run easily in the cylinder 4, so as to allow oil to enter behind the piston, whereas the oil does not rise higher than the level determined by the oil in the float chamber.

In the conduit 5 close to the cylinder 4 is a constriction 12 which can be adjusted manually with regard to the viscosity of the oil. The piston 11 is rigidly connected with an armature 13 which is influenced by an electromagnet. Current is fed to the winding 15 of the electromagnet through leads 16 and 17, of which the one 16 is provided with a switch 18, which by means of some device of well-known type, not shown here, such as a flasher, is made to close and break the circuit at suitable intervals. The piston 11, indicated on the drawing by full lines in its upper position, is in its lower position, indicated by dotted lines, in contact with a helical spring 19, by means of which the movement of the piston is limited in that direction.

The part of the vaporization tube which is filled with oil and situated above the oil tank 3 is surrounded by an electric heating element 20, to which current is supplied through leads 21 and 22, which are connected to a terminal box 23. The heating element 20 is entirely arranged below the oil level in the vaporization tube. In this way, it is only the walls, which are in touch with liquid oil and form an oil receptacle, that are heated, whereby the unavoidable deposition of carbon in the vaporization tube is considerably reduced. The top end of the tube 2 is provided with a nozzle 24, surrounded by an electric heating element 25, which by means of leads 26 and 27 is connected to the terminal box 23.