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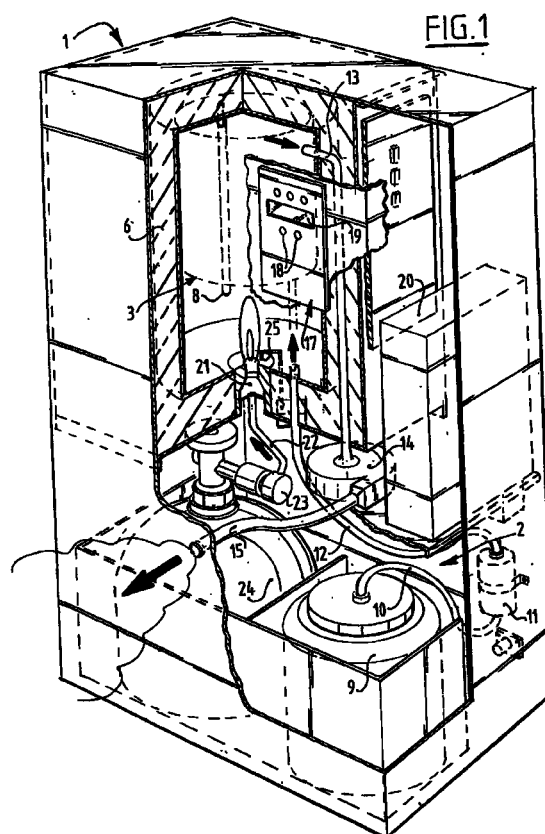
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(54) **Device for generating mist**

(57) The invention relates to a device (1) for generating mist, comprising means (2) for supplying a material for evaporating, a heating element (3) connected to the supply means for evaporating the supplied material, means for activating the heating element and means for maintaining the temperature of this element. Such a device can be connected to an alarm system, in order to fill a space very rapidly with an impenetrable mist in the case of a burglary. As a result of the temperature-maintaining means the device remains in operation when the heating element no longer functions, for instance due to a power failure. The temperature-maintaining means can comprise a secondary heating element (21), for instance a burner, in particular a gas burner.



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## Description

**[0001]** The invention relates to a device for generating mist, comprising means for supplying a material for evaporating, means connected to the supply means for evaporating the supplied material, which evaporating means comprise at least one heating element, and means for activating the evaporating means. Such a mist-generating device, also known as a mist machine, is known and is marketed by applicant under the name "3Fog Professional".

**[0002]** The mist machine is intended to generate a large quantity of impenetrable mist very rapidly, in a few seconds, through practically instantaneous evaporation of a liquid, for instance a water glycol mixture. The mist machine can form part of a security system and be activated by an alarm system. A space, for instance a shop window, can thus be immediately filled with mist in the case of a break-in, whereby goods which could possibly be stolen are concealed from the view of the thief. The thus generated mist remains suspended for a long period, for instance in the order of a half-hour, and then clears.

**[0003]** In the known mist machine use is made to evaporate the liquid of an evaporator which is formed by a spiral-shaped conduit which is accommodated in a solid block of an efficiently heat-conducting material, generally aluminium. This block of aluminium is held at a temperature of 250 to 300°C by means of a heating element, for instance an electric heating element. Due to this high temperature the liquid will evaporate explosively to form the mist in the case it is injected into the spiral-shaped conduit when the device is activated.

**[0004]** The known mist machine has the drawback of being dependent for its operation on an undisturbed supply of electricity. If therefore there is power failure for a longer period and the heating element is not operating, the evaporating block will gradually cool so much that evaporation of the liquid is no longer possible. The mist machine can thereby no longer be of use as security device.

**[0005]** The invention now has for its object to provide a mist-generating device of the above described type, wherein this drawback does not occur. This is achieved according to the invention by means for maintaining the temperature of the evaporating means. Maintaining the temperature of the evaporating means, even when as a result of for instance a power failure the heating element is no longer operating, ensures proper operation of the mist-generating device under all conditions.

**[0006]** The temperature-maintaining means preferably comprise at least one secondary heating element. The evaporating means can hereby be heated even when the primary heating element has failed.

**[0007]** An effective and low-energy device is obtained, when the secondary heating element is a burner. By making use of a burner instead of a second

electric heating element the device does not have to be provided with a large and therefore expensive battery.

**[0008]** In order to make operation of the device independent of outside influences, it preferably comprises a fuel tank connected to the burner. The device can thus operate independently in all conditions. Means are herein preferably provided for monitoring the fuel tank filling level, so that a warning can be generated when the fuel in the tank is so depleted that operation of the device can no longer be guaranteed.

**[0009]** An efficient device is obtained when the burner is a gas burner.

**[0010]** The invention will now be elucidated on the basis of an embodiment, wherein reference is made to the annexed drawing, in which:

Fig. 1 shows a partly cross-sectional perspective view of the device, and

Fig. 2 is a schematic side view of the evaporating means thereof.

**[0011]** A device 1 for generating mist comprises means 2 for supplying a material for evaporating, for instance a mixture of water and glycol, and means 3 connected to supply means 2 for evaporating this mixture. These evaporating means 3 comprise a heating element 4, in the shown embodiment an electrical heater, which is connected to a heat accumulator 5. This heat accumulator is formed by a solid block of a metal with a good heat conduction, such as aluminium. Heat accumulator 5 is enclosed by an insulating layer 6. Running through the heat accumulator is a spiral-shaped conduit 7 which is connected to supply means 2 and through which the liquid for evaporating can be pressed. Further arranged in heat accumulator 5 is a thermostat 8 which is connected to heating element 4 and which switches on this element as soon as the temperature of heat accumulator 5 falls below a determined threshold value of for instance 260°C, and which switches off heating element 4 as soon as the temperature of heat accumulator 5 threatens to exceed a determined upper limit of for instance 280°C.

**[0012]** Supply means 2 are formed by a supply container 9 which is connected over a suction line 10 to a pump 11. This pump 11 is connected in turn over a pressure line 12 to spiral-shaped conduit 7 accommodated in heat accumulator 5. Spiral-shaped conduit 7 runs out into a discharge conduit 13 which is connected via an expansion space to an outlet conduit 15.

**[0013]** Device 1 further comprises control means 16 which can take the form of a suitably programmed electronic circuit. A control panel 17 with keys 18 and a display screen 19 is present for programming the control means. Control means 16 can further be connected to an alarm system (not shown here) with which the device is activated. The control system is powered by a relatively small battery 20.

**[0014]** In order to prevent the device 1 becoming

inactive if the power supply to the heating element 4 were to fail, means 21 are present according to the invention for maintaining the temperature of evaporating means 3. In the shown embodiment these temperature-maintaining means comprise a secondary heating element 21 which is received in the insulating layer 6 on the underside of heat accumulator 5. In the shown embodiment this secondary heating element 21 is a gas burner and is connected to a gas tank 24 over a conduit 22 having accommodated therein a metering valve 23 connected to control means 16. Burner 21 comprises an electrical ignition 25 which is likewise connected to control means 16 and powered by battery 20. When the control means 16 establish that the power supply to heating element 4 has been interrupted, the metering valve 23 is opened and the ignition 25 activated, whereby burner 21 will start and thus heat the heat accumulator 5. The device 1 hereby remains in operation.

**[0015]** Because heat accumulator 5 need in principle only be kept at the already set temperature, only a low burner capacity is required. The burner 21 can thus operate for a long time, even with a relatively small volume of tank 24. Device 1 can thus remain in operation for instance for at least 60 hours without an external power source, thereby satisfying the standards set by the German certification institute for security against fire and forcible entry, VdS in Cologne, for security devices in class C, which is prescribed in the case the goods for protecting are of high value.

**[0016]** In order to be certain that the device 1 will indeed operate under all conditions, it can be further provided with means (not shown here) for monitoring the filling level of fuel tank 24. These monitoring means can for instance be formed by a pressure sensor which determines the weight of tank 24 and which generates a signal to the control means. Control means 16 can then give an alarm signal when the detected weight is too low to ensure proper operation of the burner for the required time.

**[0017]** Although the invention is elucidated above with reference to an embodiment, it will be apparent that it can be embodied in many other ways. The scope of the invention is therefore defined solely by the appended claims.

## Claims

1. Device for generating mist, comprising means for supplying a material for evaporating, means connected to the supply means for evaporating the supplied material, which evaporating means comprise at least one heating element, and means for activating the evaporating means, **characterized by** means for maintaining the temperature of the evaporating means.
2. Mist-generating device as claimed in claim 1, **characterized in that** the temperature-maintaining means comprise at least one secondary heating element.

3. Mist-generating device as claimed in claim 2, **characterized in that** the secondary heating element is a burner.
4. Mist-generating device as claimed in claim 3, **characterized by** a fuel tank connected to the burner.
5. Mist-generating device as claimed in claim 4, **characterized by** means for monitoring the filling level of the fuel tank.
6. Mist-generating device as claimed in any of the claims 3-5, **characterized in that** the burner is a gas burner.

FIG.1

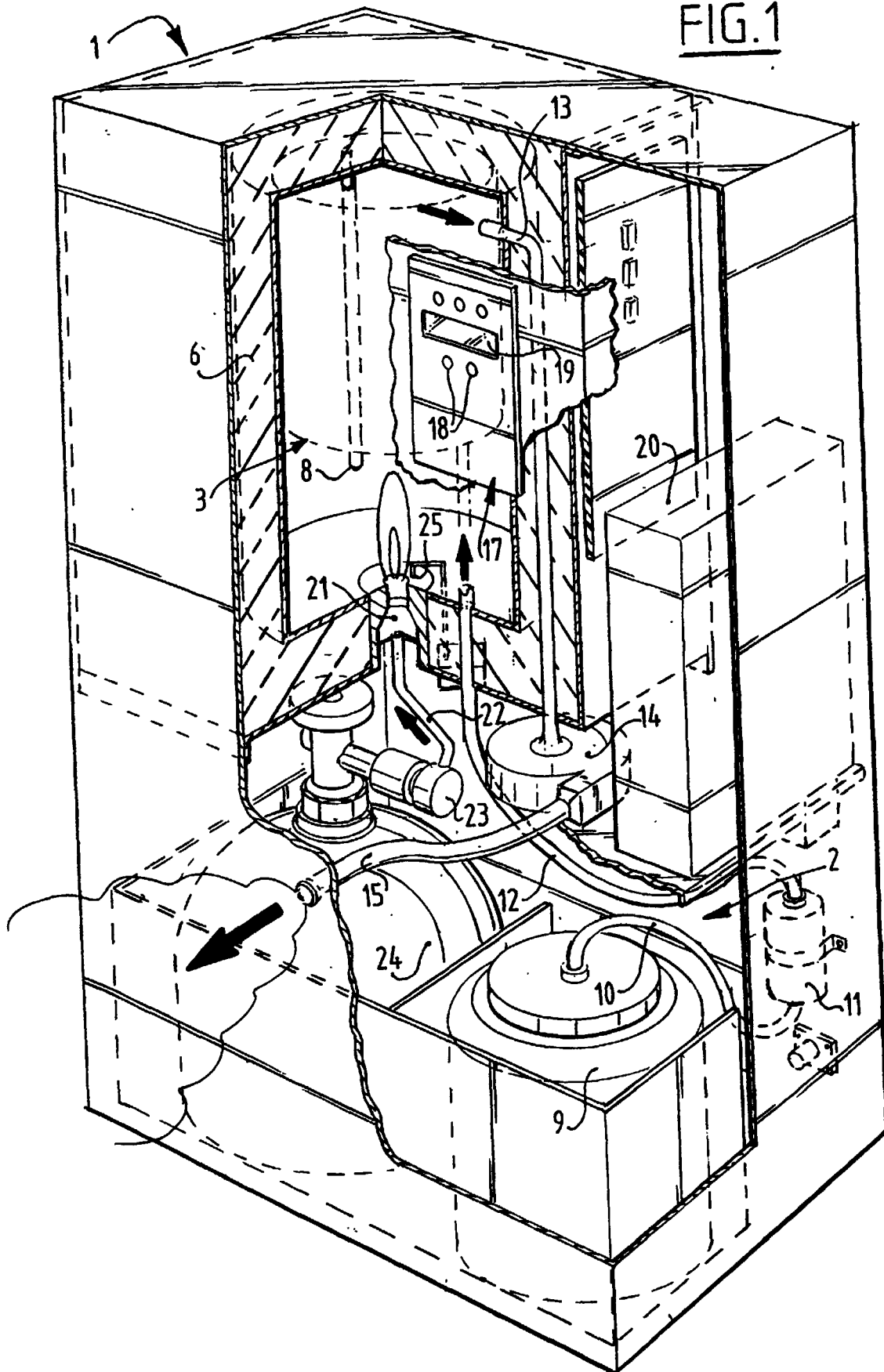


FIG.2

