

PATENT SPECIFICATION

DRAWINGS ATTACHED

L123,922



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COMPLETE SPECIFICATION

Apparatus for Vaporising Chemicals and Perfumes by Heating

We, DAINIHON JOCHUGIKU KABUSHIKI KAISHA, of No. 11, 2-chome, Tosaboridori, Nishi-ku, Osaka, Japan, a Japanese Corporation, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to an apparatus for vaporising liquids or solutions, for example liquids containing deodorant and perfuming chemicals.

It is an object of this invention to provide an apparatus of the above kind in which very little active ingredient is lost in heating, a substantially constant effect is obtained so long as any of the active ingredient remains in solution, there is no degradation of the active ingredients with the lapse of time, the amount of solution in the apparatus reservoir can be readily seen and at the same time the rate of evaporation of the solution can be easily controlled.

According to the present invention there is provided an apparatus for vaporising liquids or solutions, comprising a housing containing an electric heater, an open-mouthed receptacle, juxtaposed to said heater for containing said liquids or solutions, and capillary attraction means for drawing said liquids or solutions from said receptacle to said heater, said capillary attraction means being supported by and extending from within said receptacle through said mouth and into contact with the exterior surface of the heater, and electric current carrying means electrically connected with said heater.

Advantageously, the apparatus according to the invention consists of an electrical heater, a receptacle for a solution to be evapo-

rated and an evaporator for this solution, in which the solution is heated and evaporated, the solution being supplied continuously by capillary attraction to said evaporator which is in contact with the exterior surface of the heater. In the preferred construction, the electrical heater is held in the apparatus, which latter is freely ventilated, and below the heater there is provided a readily removable receptacle for the solution to be evaporated, an elongated evaporator, such as a wick being disposed partly within the receptacle to cause capillary ascent of the solution, said wick being in intimate contact with the heater.

The invention will be more fully understood from the following description, given by way of example, with reference to the accompanying drawings, in which:—

Figure 1 is a vertical sectional view of an embodiment of an apparatus of the invention.

Figure 2 is a horizontal sectional view of apparatus on the line A—B of Figure 1.

Figure 3 is a front elevational view of the receptacle for solutions of active ingredients in the embodiment of Figures 1 and 2.

Figures 1, 2 and 3 illustrate an embodiment of apparatus according to the invention wherein a housing 10 has a side wall 10a and lower skirt portion 10b with an upwardly-extending support wall 11 for a horizontally-disposed electrical heater 12 connected to a power supply flex 19. The housing 10 is provided at its upper end with a conventional grating for the out-flow of the vaporized solution. The solution to be evaporated is contained in a receptacle 14 provided with a screw-threaded collar 17 through which projects one end of an evaporator or wick

[Price 4s. 6d.]

18, the other end of the wick 18 being within the receptacle 14 as shown in Figure 1. The upper end of the evaporator or wick 18 is in close contact with the heater 12. A shoulder 16 of the receptacle 14 abuts a wall 15 of the housing 10, this wall having an upwardly-extending screw-threaded collar portion 15' which engages with the screw-threaded collar 17 for attachment of the receptacle 14 to the housing 1.

The heater preferably comprises a glass-and-oxide coated metal plate, for example, of iron, interposed in an electric circuit. In the preparation of this heater, an iron plate, cleaned with acid and/or alkali, is covered with glass powder and heated at a temperature above 1200° C. in a high-temperature furnace. The glass coated plate is cooled to a temperature between 450° C.—750° C., a solution of tin tetrachloride is sprayed over the glass coating. Instead of the tin, metallic chlorides of antimony, zinc, cadmium, vanadium, copper, nickel or manganese can be used. The solvent for the chloride can be, for example, water, methanol or acetic acid. It is desirable that an additional spray coating of the chloride is applied and heat-treated, the greater part of metallic chloride there by being oxidized. Conductive metal terminals are then attached to the metal plate. Obviously, the plate may be of any desired shape, such as flat, cylindrical or tubular, for example. The heater may be supported in any suitable way, such as by a holder or brackets of, for example, hard glass or ceramic material or plastics material, such as polycarbonate, polypropylene, polyethylchloride, silicone resin, or fluorine-containing resin.

The elongate evaporator or wick may comprise fibre asbestos, diatomaceous earth and the like in tape or board form. The solution to be evaporated can be supplied to one end portion evaporator dipped in the solution or associated with some other suitable material capable of drawing up the solution. The evaporator may either be dipped in the solution by the operator or, reserve receptacles containing fresh solution may be substituted as required, the evaporator communicating with the solution through some suitable means without the necessity of dipping it in the solution.

Examples of active ingredients which can be used in this apparatus, and which are easily evaporated when heated, are the following: pyrethrum insecticides such as pyrethrine, allethrin; Chlorinated insecticides such as 1,2,3,4,5,6-hexachlorocyclohexane or 1,1,1-trichloro-2,2-bis-(p-chlorophenyl)-ethane; organic phosphoric insecticides such as dimethyl-dichlorovinyl phosphate, 0,0-diethyl-0-(2-isopropyl-6-methyl-4-pyrimidinyl)-phosphorothioate or sumithione; fungicides, such as formaldehyde solutions or the cresols; organic sulphur-containing fungicides, such as

1,2,5-trithiacyclo-heptadiene - 3,4,6,7-tetrani-trile; organo-mercury fungicides; insect repellents such as N,N-diethyl-m-toluamide; deodorants such as lauryl methacrylate; and scents, such as musk, clove oil or rose.

The solutions to be used in the apparatus of the present invention contain two or more of the above-mentioned active ingredients, dissolved in a suitable solvent, such as petroleum ether, an alcohol or an ether. Two typical examples of such solutions are the following:—

EXAMPLE 1.

Ethanol (or petroleum ether)	100 g.
p-tert-butyl-o-cresol	0.05 g
Perfume	1 g
1,2,3,4,5,6-hexachlorocyclohexane (or 1,1,1-trichloro-2,2-bis- (p-chlorophenyl)-ethane)	0.2 g
N-(2-ethyl-hexyl)-1-isopropyl-4- methyl-bicyclo-[2.2.2]- oct-5-ene-2,3-dicarboximide	1 g
Colouring matter (optional)	0.8 g
Lauryl methacrylate (deodorant)	1 g

EXAMPLE 2.

Allethrin	3 g
Piperonyl butoxide (or octachloro-propyl ether) (Synergist)	1.5 g
Petroleum ether	95.5 g

After the chemicals are mixed and dissolved, the solution obtained is ready for use.

The solutions of examples 1 and 2 generally evaporate at a temperature of 80°—110° C. When dealing with some kinds of mosquito which are most abundant in the evening until about 10 p.m. and are less abundant afterwards, the active ingredients can be used effectively and economically, by arranging that the quantity of insecticidal material evaporating is largest at first and less later on, when the mosquitos are less abundant.

In operation of the apparatus of the invention, the heater 12, when supplied with electrical current, is heated and the wick 18 in contact with the heater also becomes heated and the insecticide-containing solution saturating the wick 17 is evaporated. Since the wick 18 is in contact with or close to the heater 14, the heating efficiency is very high and accordingly the evaporation of the solution is made very easy.

In our copending Application No. 7460/68 (Serial No. 1,123,923), we have described and claimed an apparatus for vaporizing liquids or solutions using an electric heater which emits far infra red rays.

WHAT WE CLAIM IS:—

1. Apparatus for vaporising liquids or solutions, comprising a housing containing an electric heater, an open-mouthed receptacle, juxtaposed to said heater, for containing



18, the other end of the wick 18 being within the receptacle 14 as shown in Figure 1. The upper end of the evaporator or wick 18 is in close contact with the heater 12. A shoulder 16 of the receptacle 14 abuts a wall 15 of the housing 10, this wall having an upwardly-extending screw-threaded collar portion 15' which engages with the screw-threaded collar 17 for attachment of the receptacle 14 to the housing 1.

The heater preferably comprises a glass-and-oxide coated metal plate, for example, of iron, interposed in an electric circuit. In the preparation of this heater, an iron plate, cleaned with acid and/or alkali, is covered with glass powder and heated at a temperature above 1200° C. in a high-temperature furnace. The glass coated plate is cooled to a temperature between 450° C.—750° C., a solution of tin tetrachloride is sprayed over the glass coating. Instead of the tin, metallic chlorides of antimony, zinc, cadmium, vanadium, copper, nickel or manganese can be used. The solvent for the chloride can be, for example, water, methanol or acetic acid. It is desirable that an additional spray coating of the chloride is applied and heat-treated, the greater part of metallic chloride there by being oxidized. Conductive metal terminals are then attached to the metal plate. Obviously, the plate may be of any desired shape, such as flat, cylindrical or tubular, for example. The heater may be supported in any suitable way, such as by a holder or brackets of, for example, hard glass or ceramic material or plastics material, such as polycarbonate, polypropylene, polyethylchloride, silicone resin, or fluorine-containing resin.

The elongate evaporator or wick may comprise fibre asbestos, diatomaceous earth and the like in tape or board form. The solution to be evaporated can be supplied to one end portion evaporator dipped in the solution or associated with some other suitable material capable of drawing up the solution. The evaporator may either be dipped in the solution by the operator or, reserve receptacles containing fresh solution may be substituted as required, the evaporator communicating with the solution through some suitable means without the necessity of dipping it in the solution.

Examples of active ingredients which can be used in this apparatus, and which are easily evaporated when heated, are the following: pyrethrum insecticides such as pyrethrin, allethrin; Chlorinated insecticides such as 1,2,3,4,5,6-hexachlorocyclohexane or 1,1,1-trichloro-2,2-bis-(p-chlorophenyl)-ethane; organic phosphoric insecticides such as dimethyl-dichlorovinyl phosphate, 0,0-diethyl-0-(2-isopropyl-6-methyl-4-pyrimidinyl)-phosphorothioate or sumithione; fungicides, such as formaldehyde solutions or the cresols; organic sulphur-containing fungicides, such as

1,2,5-trithiacyclo-heptadiene - 3,4,6,7-tetranitrile; organo-mercury fungicides; insect repellents such as N,N-diethyl-m-toluamide; deodorants such as lauryl methacrylate; and scents, such as musk, clove oil or rose.

The solutions to be used in the apparatus of the present invention contain two or more of the above-mentioned active ingredients, dissolved in a suitable solvent, such as petroleum ether, an alcohol or an ether. Two typical examples of such solutions are the following:—

EXAMPLE 1.

Ethanol (or petroleum ether)	100 g.	
p-tert-butyl-o-cresol	0.05 g	80
Perfume	1 g	
1,2,3,4,5,6-hexachlorocyclohexane (or 1,1,1-trichloro-2,2-bis-(p-chlorophenyl)-ethane)	0.2 g	85
N-(2-ethyl-hexyl)-1-isopropyl-4-methyl-bicyclo-[2.2.2]-oct-5-ene-2,3-dicarboximide	1 g	
Colouring matter (optional)	0.8 g	
Lauryl methacrylate (deodorant)	1 g	

EXAMPLE 2.

Allethrin	3 g	90
Piperonyl butoxide (or octachloro-propyl ether) (Synergist)	1.5 g	
Petroleum ether	95.5 g	95

After the chemicals are mixed and dissolved, the solution obtained is ready for use.

The solutions of examples 1 and 2 generally evaporate at a temperature of 80°—110° C. When dealing with some kinds of mosquito which are most abundant in the evening until about 10 p.m. and are less abundant afterwards, the active ingredients can be used effectively and economically, by arranging that the quantity of insecticidal material evaporating is largest at first and less later on, when the mosquitos are less abundant.

In operation of the apparatus of the invention, the heater 12, when supplied with electrical current, is heated and the wick 18 in contact with the heater also becomes heated and the insecticide-containing solution saturating the wick 17 is evaporated. Since the wick 18 is in contact with or close to the heater 14, the heating efficiency is very high and accordingly the evaporation of the solution is made very easy.

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WHAT WE CLAIM IS:—

1. Apparatus for vaporising liquids or solutions, comprising a housing containing an electric heater, an open-mouthed receptacle, juxtaposed to said heater, for containing



- said liquids or solutions, and capillary attraction means for drawing said liquids or solutions from said receptacle to said heater, said capillary attraction means being supported by
- 5 and extending from within said receptacle through said mouth and into contact with the exterior surface of the heater, and electric current carrying means electrically connected with said heater.
- 10 2. Apparatus as claimed in claim 1 in which said heater is an electric resistance heater.
3. Apparatus as claimed in claim 1 or claim 2 in which said capillary attraction means is an elongate wick of fibrous material.
4. Apparatus as claimed in any of claims 1 to 3 in which the current carrying means are supported by the heater.
5. Apparatus for vaporising liquids or solutions substantially as herein described with reference to and as shown in the accompanying drawings.
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