

## DESCRIPTION

## TITLE OF INVENTION

## SCALED REPTILE REPELLENT

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## TECHNICAL FIELD

[0001]

The present invention relates to a scaled reptile repellent, and more particularly to a scaled reptile repellent used in a form of an aerosol agent.

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## BACKGROUND ART

[0002]

Geckos are considered beneficial animals since they prey on small pests such as insects, spiders, and mosquitoes, but they cause problems such as indoor intrusion and fecal damage. The geckos inhabit areas with a temperature around 30°C, and are distributed on all continents except Antarctica. It has been confirmed that the geckos also inhabit Honshu, Shikoku, Kyushu, and surrounding islands in Japan. The geckos are nocturnal and appear at night by aiming at insects gathering in streetlights and light of private houses, so that the geckos can be found sticking to walls and windows.

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[0003]

In the related art, the geckos are sent away by repelling, for example, by sprinkling a repellent that diffuses odor disliked by the geckos and similar animals. As such a repellent, for example, a reptile repellent containing a glycol ether represented by a specific general formula as an active ingredient (Patent Literature 1) and an animal repelling/deodorizing agent containing limonene as a main component (Patent Literature 2) are proposed. Patent Literature 1 discloses that the glycol ether represented by the above specific general formula has an effect on repelling reptiles such as snakes and lizards, and Patent Literature 2 discloses that limonene has an effect on repelling snakes and geckos.

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## 30 CITATION LIST

## PATENT LITERATURE

[0004]

Patent Literature 1: JP-A-S61-289002

## SUMMARY OF INVENTION

## TECHNICAL PROBLEM

[0005]

However, when the repellent as described in Patent Literatures 1 and 2 is used, the repellent exhibits a repellent effect immediately after spraying, but has a problem of low sustainability of the effect because the odor diminishes over time.

There is also a problem that, since scaled reptiles such as the gecko and the lizard stick to high places and vertical surfaces such as walls and windows, it is difficult to easily treat active ingredients in such places.

An object of the present invention is to provide a scaled reptile repellent that continuously exhibits an excellent repellent effect on a scaled reptile and can be easily used from an initial stage of use to a final stage of use without variations in effects.

## SOLUTION TO PROBLEM

[0006]

As a result of intensive studies on the above problems, a present inventor has found that the above problems can be solved by incorporating at least one of a solvent having a hydroxy group or a ketone group and a silicone powder together with an inorganic powder in an aerosol agent containing the inorganic powder as an active ingredient, and have completed the present invention.

[0007]

That is, the present invention is characterized by the following (1) to (3).

(1) A scaled reptile repellent in which the form of the scaled reptile repellent is an aerosol agent in which an aerosol composition containing a stock solution and a propellant is filled in a pressure resistant container, and the stock solution containing an inorganic powder as an active ingredient, and at least one of a solvent having a hydroxy group or a ketone group and a silicone powder.

(2) The scaled reptile repellent according to (1), in which the solvent having the hydroxyl group or the ketone group is at least one selected from a group consisting of alcohols having 2 to 4 carbon atoms and acetone.

(3) The scaled reptile repellent according to (1) or (2), in which a content ratio of the

inorganic powder to the silicone powder, inorganic powder/silicone powder, is 2 to 75 in terms of a mass ratio.

#### ADVANTAGEOUS EFFECTS OF INVENTION

[0008]

The scaled reptile repellent according to the present invention can be easily treated in a place desired to be treated, since the repellent has a form of an aerosol agent. In addition, the inorganic powder exhibiting the repellent effect on the scaled reptile is excellent in dispersibility in the aerosol composition and caking is also prevented, and thus this allows for spraying the repellent in a constant manner from an initial stage of use to a final stage of use of the repellent, and allows for continuously achieving an excellent repellent effect on the scaled reptile.

#### DESCRIPTION OF EMBODIMENTS

[0009]

Hereinafter, a scaled reptile repellent according to the present invention will be described.

In the present description, “mass” has the same meaning as “weight”.

[0010]

A scaled reptile subjected to be repelled in the present invention is a group that belongs to reptiles, including lizards and snakes. Specific examples of scaled reptiles include: lizard suborders such as geckos, lizards, lacertids, iguanas and chameleons, snake suborders such as rat snakes and pit vipers, and Amphisbaenia suborders such as worm lizards.

[0011]

The scaled reptile repellent according to the present invention has a form of an aerosol agent in which an aerosol composition containing a stock solution and a propellant is filled in a pressure resistant container, and the stock solution contains an inorganic powder as an active ingredient, and at least one of a solvent having a hydroxy group or a ketone group and a silicone powder. Hereinafter, each component will be described.

[0012]

(Stock Solution)

As described above, the stock solution contains at least an inorganic powder, and at least one of a solvent having a hydroxy group or a ketone group and a silicone powder.

[0013]

In the present invention, the inorganic powder is an active ingredient that repels a scaled reptile. For example, when the scaled reptile is a gecko, surfaces of feet of the gecko are covered with very fine hairs and this intermolecular force allows the gecko to climb even on a vertical or upside down wall. The inorganic powder can enter a gap between the fine hairs on the surfaces of the feet of the gecko, reduce the intermolecular force when the gecko sticks to the wall, and physically repel the gecko.

[0014]

Examples of the inorganic powder include silica (silicon dioxide), alumina, zinc oxide, titanium oxide, magnesium oxide, aluminum hydroxide, calcium carbonate, talc, mica, pearlite, silicic acid, silicates (magnesium silicate, calcium silicate, and the like), and kaolin, and at least one selected from a group consisting of these can be used. Among these, from a viewpoint of adhesion to a treatment target such as a wall, it is preferable to use at least one selected from a group consisting of silica, calcium carbonate, and talc.

[0015]

An average particle diameter of the inorganic powder is not limited as long as the average particle diameter is within a range in which the inorganic powder does not prevent clogging of a nozzle hole or the like of the aerosol agent, but is, for example, preferably within a range of 0.1 to 100  $\mu\text{m}$ , more preferably within a range of 0.1 to 50  $\mu\text{m}$ , and still more preferably within a range of 1 to 20  $\mu\text{m}$ . When the average particle diameter of the inorganic powder is within the above range, the inorganic powder can be uniformly attached to a surface of the treatment target, and the surface of the treatment target is not contaminated. The average particle diameter of the inorganic powder can be measured by, for example, particle size distribution measurement by a Coulter counter method or a laser diffraction scattering.

[0016]

The inorganic powder is preferably contained in the stock solution in a range of 0.75 mass% to 20 mass% (w/w%). When a content of the inorganic powder in the stock solution is 0.75 mass% or more, diffusion of the inorganic powder can be easily confirmed when the stock solution is stirred, and thus, uniformity of the stock solution when filling a pressure resistant container in manufacture of the aerosol agent can be easily confirmed. On the other hand, too large content of the inorganic powder will reduce a stirring property of the stock solution and this makes stable manufacturing difficult. Thus, the content is preferably 20 mass% or less. The content of the inorganic powder in the stock solution is more preferably

1 mass% or more, and still more preferably 1.5 mass% or more, and is more preferably 15 mass% or less, and still more preferably 7 mass% or less.

[0017]

5 The content of the inorganic powder in the aerosol composition is preferably in a range of 0.25 to 10 mass%, more preferably in the range of 0.28 to 7.5 mass%, and still more preferably in the range of 0.3 to 3.5 mass%. When the content of the inorganic powder in the aerosol composition is 0.25 mass% or more, the inorganic powder can be uniformly attached to the surface of the treatment target, and thus this achieves a sufficient repellent effect of the scaled reptile. Poor re-dispersibility of the inorganic powder in the aerosol composition  
10 sometimes causes a large amount of the inorganic powder to be sprayed at the initial use of the aerosol agent, and repeating such a spraying causes a discharge amount of the inorganic powder to decrease at the final stage of use, and this may prevent achieving an effect as at the initial stage of use. When the content of the inorganic powder in the aerosol composition is 10 mass% or less, the inorganic powder is easily re-dispersed in the aerosol agent, the discharge  
15 amount is stable, and this causes no difference in the effect between the initial stage of use and the final stage of use.

[0018]

The stock solution contains at least one of a solvent having a hydroxy group or a ketone group and a silicone powder, for keeping dispersion stability of the inorganic powder in  
20 the aerosol composition.

[0019]

The solvent having the hydroxy group or the ketone group has high affinity with the inorganic powder and can dissolve a part of the inorganic powder. This can improve the dispersibility of the inorganic powder in the aerosol composition and can prevent caking. The  
25 silicone powder also has the affinity with the inorganic powder, and thus the silicone powder can improve the dispersibility of the inorganic powder in the aerosol composition and can prevent the caking.

[0020]

30 Examples of the solvent having the hydroxy group or the ketone group include primary alcohols such as ethanol and butanol, secondary alcohols such as isopropyl alcohol, ketones such as acetone and ethyl methyl ketone, carboxylic acids such as acetic acid, and esters such as ethyl acetate. Among these, from the viewpoint of the stability of the inorganic powder in the aerosol composition, it is preferable to use at least one selected from a group

consisting of alcohols having 2 to 4 carbon atoms and acetone, and it is more preferable to use at least one selected from a group consisting of ethanol, isopropyl alcohol, and acetone.

[0021]

5 The solvent having the hydroxy group or the ketone group is preferably contained in an amount of 7.5 to 65 mass% in the stock solution. When the content of the solvent having the hydroxy group or the ketone group is 7.5 mass% or more in the stock solution, the solvent has affinity with the surface of the inorganic powder uniformly, and the inorganic powder can be dissolved, and thus this can improve the dispersibility of the inorganic powder in the stock solution and can also improve the re-dispersibility. When the content of the solvent is 65  
10 mass% or less, the caking of the stock solution can be prevented. The content of the solvent having the hydroxy group or the ketone group is more preferably 8.5 mass% or more, and still more preferably 10 mass% or more, and is more preferably 60 mass% or less, and still more preferably 55 mass% or less.

[0022]

15 The content of the solvent having the hydroxyl group or the ketone group in the aerosol composition is preferably in the range of 3 to 30 mass%, more preferably in the range of 4 to 30 mass%, and still more preferably in the range of 4.5 to 30 mass%. When the content of the solvent having the hydroxy group or the ketone group in the aerosol composition is 3 mass% or more, the solvent having the hydroxy group or the ketone group is not separated in  
20 preparation even when the propellant is filled. Thus, the dispersibility of the inorganic powder can be improved and the re-dispersibility can be improved. When the content is 30 mass% or less, the caking of the aerosol composition can be prevented.

[0023]

25 The silicone powder is preferably a powder of a compound having a silicate group and a silyl group, and more preferably a powder having a siloxane bond. Examples of the silicone powder include trimethylsiloxysilicate and polymethylsilsesquioxane. Among these, trimethylsiloxysilicate is preferable from the viewpoint of solubility in the solvent in the stock solution.

[0024]

30 The average particle diameter of the silicone powder is not limited, but is preferably in the range of 0.1 to 1000  $\mu\text{m}$ , more preferably 0.5 to 500  $\mu\text{m}$ , and still more preferably 1 to 100  $\mu\text{m}$  from the viewpoint of the solubility in the solvent. The silicone powder having the average particle diameter within the above range allows for improving the dispersibility and the

re-dispersibility due to affinity with the surface of the inorganic powder, and also allows for preventing the clogging of the nozzle hole and the like of the aerosol agent. The average particle diameter of the silicone powder can be measured by, for example, particle size distribution measurement by a Coulter counter method or a laser diffraction scattering.

5 [0025]

The silicone powder is preferably contained in an amount of 0.05 mass% to 1.1 mass% in the stock solution. When the content of the silicone powder in the stock solution is 0.05 mass% or more, the silicone powder has affinity with the surface of the inorganic powder uniformly, and thus this allows for improving the dispersibility of the inorganic powder in the stock solution, and also allows for improving the re-dispersibility. When the content of the silicone powder is 1.1 mass% or less, the caking of the stock solution can be prevented. The content of the silicone powder is more preferably 0.06 mass% or more, and still more preferably 0.08 mass% or more, and is more preferably 1.05 mass% or less, and still more preferably 1 mass% or less.

15 [0026]

The content of the silicone powder in the aerosol composition is preferably in the range of 0.03 to 0.5 mass%, more preferably in the range of 0.035 to 0.49 mass%, and still more preferably in the range of 0.04 to 0.48 mass%. When the content of the silicone powder in the aerosol composition is 0.03 mass% or more, the silicone powder has affinity with the surface of the inorganic powder uniformly, and thus this allows for improving the dispersibility of the inorganic powder and also allows for improving the re-dispersibility, and when the content is 0.5 mass% or less, the caking in the aerosol composition can be prevented.

[0027]

The silicone powder is preferably contained such that an inorganic powder/silicone powder is 2 to 75 in terms of a mass ratio, with respect to the inorganic powder, and a content ratio of the inorganic powder to the silicone powder is more preferably 3 to 75, and still more preferably 3.5 to 75. When the inorganic powder/silicone powder (mass ratio) is in the above range, the dispersibility of the inorganic powder in the aerosol composition can be improved, and the re-dispersibility can also be improved without caking.

30 [0028]

In the present invention, the stock solution preferably contains a nonpolar solvent. The nonpolar solvent can be used as a solvent for mixing and dissolving an inorganic powder and at least one of a solvent having a hydroxy group or a ketone group and a silicone powder.

When a solvent having a hydroxy group or a ketone group is contained, the affinity between polar components is improved by containing the nonpolar solvent.

[0029]

5 Examples of the nonpolar solvent include aliphatic hydrocarbons such as normal hexane, normal pentane, normal paraffin, isoparaffin, naphthene, and olefin; and aromatic hydrocarbons such as benzene, toluene, xylene, and mesitylene.

[0030]

10 Examples of commercially available nonpolar solvents include Isopar L (isoparaffin), Isopar M (isoparaffin), Exxsol D80 (naphthene), and Exxsol D110 (naphthene) manufactured by Exxon Mobil Corporation, and Neothiosol (normal paraffin) manufactured by Sanko Chemical Industry Corporation.

[0031]

15 A content of the nonpolar solvent in the stock solution is preferably in the range of 30 to 99.2 mass%, more preferably 35 to 95 mass%, and still more preferably 40 to 90 mass%. When the content of the nonpolar solvent in the stock solution is within the above range, the inorganic powder can be uniformly dissolved in the stock solution without impairing the effect of the present invention of the inorganic powder, and at least one of the solvent having the hydroxy group or the ketone group and the silicone powder.

[0032]

20 The content of the nonpolar solvent in the aerosol composition is preferably in the range of 15 to 50 mass%, more preferably in the range of 17.5 to 47.5 mass%, and still more preferably in the range of 20 to 45 mass%. When the content of the nonpolar solvent in the aerosol composition is within the above range, the effect of the present invention is not impaired.

[0033]

25 When the solvent having the hydroxy group or the ketone group is contained in the present invention, the nonpolar solvent is preferably contained such that the solvent having the hydroxy group or the ketone group/nonpolar solvent is 0.01 to 1.2 in terms of a mass ratio with respect to the solvent having the hydroxy group or the ketone group, and a content ratio of the solvent having the hydroxy group or the ketone group to the nonpolar solvent is more preferably  
30 0.02 to 1.15, and still more preferably 0.04 to 1.1. When the solvent having the hydroxy group or the ketone group/nonpolar solvent (mass ratio) is within the above range, the dispersibility of the inorganic powder in the aerosol composition can be improved, and the re-dispersibility can also be improved without caking.

[0034]

The stock solution may contain other components as long as the effects of the present invention are not impaired. Examples of other components include an aromatic component, a deodorant component, a preservative, other solvents, a pH adjuster, an ultraviolet absorber, a surfactant, and a dissolution aid.

[0035]

Examples of the aromatic component include mint oil, orange oil, fennel oil, cinnamon oil, clove oil, turpentine oil, eucalyptus oil, hiba oil, jasmine oil, neroli oil, peppermint oil, bergamot oil, petitgrain oil, lemon oil, lemon glass oil, cinnamon oil, citronella oil, geranium oil, citral, l-menthol, citronellyl acetate, cinnamaldehyde, terpineol, nonyl alcohol, cis-jasmone, limonene, linalool, 1,8-cineole, geraniol,  $\alpha$ -pinene, p-menthane-3,8-diol, eugenol, menthyl acetate, thymol, benzyl benzoate, benzyl salicylate, anise oil, lavender oil, rose oil, rosemary oil, grapefruit oil, camphene, p-cymene, citronellol, nerol, benzyl alcohol, n-butylaldehyde, isobutylaldehyde, coumarin and cineole. One of them may be used alone or two or more of them may be used in combination.

[0036]

Examples of the deodorant component include components that adsorb odor components, such as green tea extract, persimmon tannin, lauryl acid methacrylate, methyl benzoate, methyl phenylacetate, geranyl crotonate, acetophenone myristate, benzyl acetate, benzyl propionate, and silver, and components that mask the odor components, such as the above aromatic components. One of them may be used alone or two or more of them may be used in combination.

[0037]

Examples of the preservative include p-hydroxybenzoate such as methyl p-hydroxybenzoate, ethyl p-hydroxybenzoate, and butyl p-hydroxybenzoate, and isothiazolines such as phenoxyethanol and methylisothiazolinone. One of them may be used alone or two or more of them may be used in combination.

[0038]

Examples of other solvents include water such as tap water, deionized water, and distilled water, and ethers such as diethyl ether. One of them may be used alone or two or more of them may be used in combination.

[0039]

Examples of the pH adjuster include citric acid, citrate, phosphate, potassium

carbonate, sodium hydrogen carbonate, and ammonium hydrogen carbonate. One of them may be used alone or two or more of them may be used in combination.

[0040]

5 Examples of the ultraviolet absorber include para-aminobenzoic acid, monoglyceryl para-aminobenzoate, octyl salicylate, phenyl salicylate, isopropyl paramethoxycinnamate, and octyl paramethoxycinnamate. One of them may be used alone or two or more of them may be used in combination.

[0041]

10 The surfactant is not limited as long as the surfactant is a commonly used surfactant. Examples of the surfactant include various surfactants such as nonionic surfactants, anionic surfactants, cationic surfactants, amphoteric surfactants, and sucrose fatty acid ester-based surfactants. One of them may be used alone or two or more of them may be used in combination.

[0042]

15 Examples of the dissolution aid include fatty acid esters such as isopropyl myristate. One of them may be used alone or two or more of them may be used in combination.

[0043]

20 The stock solution is obtained by mixing the inorganic powder, at least one of the solvent having the hydroxy group or the ketone group and the silicone powder, and any component.

Viscosity of the stock solution is preferably 1000 mPa·s or less, more preferably 0.25 to 750 mPa·s, and still more preferably 0.5 to 500 mPa·s at 20°C from the viewpoint of a filling property into the pressure resistant container for aerosol.

[0044]

25 In the present invention, the content of the stock solution in the aerosol composition is preferably 10 to 95 mass%. Too small content of the stock solution causes the stock solution to be less likely to attach to the treatment target, and leads to a small amount of the inorganic powder to be attached to the surface of the treatment target, and thus, this makes it difficult to achieve the effect of the present invention. Too large content of the stock solution may cause uneven spraying of the aerosol composition. Thus, the above range is preferable. A lower  
30 limit of the content of the stock solution in the aerosol composition is more preferably 15 mass% or more, and still more preferably 20 mass% or more, and an upper limit of the content of the stock solution is more preferably 90 mass% or less, and still more preferably 85 mass% or less.

[0045]

(Propellant)

The propellant is a medium for spraying the stock solution, and is pressurized and filled in the pressure resistant container together with the stock solution.

As the propellant, for example, one or more of liquefied petroleum gas (LPG) such as propane, propylene, n-butane and isobutane, liquefied gas such as dimethyl ether (DME), compressed gas such as carbon dioxide gas, nitrogen gas and compressed air, and halogenated carbon gas such as HFC-152a, HFC-134a, HFO-1234yf, and HFO-1234ze can be used. The propellant to be used may be appropriately selected in accordance with compatibility with the stock solution and a container member such as an aerosol valve.

[0046]

A content of the propellant in the aerosol composition is preferably 5 to 90 mass% in the aerosol composition. When the content of the propellant in the aerosol composition is 5 mass% or more, the stock solution can be sprayed as sprayed particles, and thus, this allows for spraying the inorganic powder uniformly, and allows for achieving a sufficient repellent effect. When the content of the propellant is 90 mass% or less, a sufficient amount of inorganic powder can be sprayed for repelling. The lower limit of the content of the propellant in the aerosol composition is more preferably 10 mass% or more, and still more preferably 15 mass% or more, and the upper limit thereof is more preferably 85 mass% or less, and still more preferably 80 mass% or less.

[0047]

A volume ratio of the stock solution to the propellant in the aerosol composition is preferably 10:90 to 90:10, more preferably 15:85 to 85:15, and still more preferably 20:80 to 80:20 in terms of stock solution:propellant. When the range of the volume ratio is adjusted to such a volume ratio, the solution containing the inorganic powder can be efficiently diffused and sprayed, and can be easily attached to a treatment surface. Thus, the aerosol composition can be easily treated in a wide range.

The volume ratio of the stock solution and the propellant can be obtained by dividing the mass of each of the stock solution and the propellant by a specific gravity.

[0048]

The scaled reptile repellent according to the present invention is constituted by filling the pressure resistant container for aerosol with the above stock solution and propellant, and closing an opening of the pressure resistant container with the aerosol valve. Regarding the

aerosol agent, the aerosol composition (stock solution and propellant) in the pressure resistant container is pushed out of the pressure resistant container through the aerosol valve by operation of a spray member (hereinafter, also referred to as a spray button) attached to the aerosol valve by a user, and at this time, the stock solution is made into particles by the propellant and is  
5 sprayed.

[0049]

(Aerosol Valve)

The aerosol valve includes an opening and closing member for switching between communication and blocking between the inside and the outside of the pressure resistant  
10 container when the spray member is operated by the user, a housing to which the opening and closing member is attached, and a mount member for holding the housing at a predetermined position of the pressure resistant container. The opening and closing member includes a stem configured to slide up and down in conjunction with the spray member. By the sliding of the stem, the communication (spraying state) and the blocking (non-spraying state) of the aerosol  
15 composition are switched. A housing hole for taking the aerosol composition from the pressure resistant container is formed in the housing. The stem has a stem hole for sending the aerosol composition taken into the housing to the spray member. A path from the housing hole to the stem hole constitutes an internal passage through which the aerosol composition passes.

20 [0050]

(Stem Hole)

A shape of the stem hole of the stem may be circular or polygonal. When the stem hole is circular, a size of the stem hole is preferably 0.1 to 2.0 mm in diameter, more preferably 0.2 to 1.7 mm in diameter, and still more preferably 0.3 to 1.5 mm in diameter. When the  
25 shape of the stem hole is polygonal, the size of the stem hole may be equivalent to that in the case that the shape of the stem hole is circular.

The size of an under-tap hole of the stem is preferably 0.2 to 3.0 mm in diameter, more preferably 0.3 to 2.5 mm in diameter, and still more preferably 0.5 to 2.0 mm in diameter. The shape of the under-tap hole may be circular or polygonal, and when the shape is polygonal,  
30 the size of the under-tap hole may be equivalent to that in the case that the shape is circular.

The stem may or may not have a vapor tap hole. When the stem has a vapor tap hole, the size of the vapor tap hole is preferably 0.1 to 1.2 mm in diameter, more preferably 0.2 to 1.1 mm in diameter, and still more preferably 0.3 to 1.0 mm in diameter. The shape of the

vapor tap hole may be circular or polygonal, and when the shape is polygonal, the size of the vapor tap hole may be equivalent to that in the case that the shape is circular.

The number of stem holes and vapor tap holes may be one or more. The size of the stem hole and the vapor tap hole is a total size, when two or more stem holes and vapor tap  
5 holes are provided.

[0051]

(Spray Member)

The spray member (spray button) is a member attached to a pressure resistant container via an aerosol valve. In the spray button, an internal passage in the operation portion  
10 through which the aerosol composition taken from the pressure resistant container through the stem hole of the aerosol valve passes, and a nozzle hole through which the aerosol composition is sprayed are provided.

[0052]

A shape of the nozzle hole of the spray button may be circular or polygonal. When  
15 the nozzle hole is circular, an inner diameter (nozzle hole diameter) of the nozzle hole may be appropriately adjusted according to a design of a spraying amount and a spraying time. For example, the diameter is preferably 0.1 to 3.0 mm, more preferably 0.2 to 2.7 mm, and still more preferably 0.3 to 2.5 mm. When the shape of the nozzle hole is polygonal, the size of the nozzle hole may be equivalent to that in the case that the shape of the nozzle hole is circular.

20 A plurality of nozzle holes having the same area as these may be provided.

[0053]

(Aerosol Internal Pressure)

An internal pressure of the aerosol agent is preferably 0.1 to 0.7 MPa, more preferably 0.15 to 0.6 MPa, and still more preferably 0.2 to 0.6 MPa, in terms of the inner pressure at 25°C.

25 When the internal pressure is too strong, aerosol preparation may burst, and when the internal pressure is too weak, a force of discharging the aerosol composition is weakened, and the aerosol composition may not be sufficiently attached to the treatment target. Therefore, the internal pressure is preferably in the above range.

The internal pressure can be measured with a pressure gauge (for example, PGM-E  
30 small-sized pressure sensor (manufactured by Kyowa Electronic Instruments Corporation) attached to a WGA-710C instrumentation conditioner (manufactured by Kyowa Electronic Instruments Corporation)) after keeping the temperature of the aerosol agent in a constant temperature chamber or the like and setting the temperature to 25°C.

[0054]

(Injection Pressure)

The injection pressure of the aerosol agent is preferably 5 to 600 gf, and more preferably 8 to 500 gf, when measured at a position 5 cm away from the nozzle hole. When the injection pressure is too strong, the inorganic powder does not attach to the treatment target and may fall or scatter to fail to achieve the repellent effect sufficiently. When the injection pressure is too weak, the spray does not reach the treatment target and the inorganic powder does not attach to the treatment target to fail to achieve the repellent effect sufficiently. Therefore, the injection pressure is preferably in the above range.

The injection pressure can be measured by placing a circular flat plate having a diameter of 6 cm attached to a digital force gauge (for example, model number: DS2-2N, manufactured by Imada Corporation) at a distance of 5 cm in a vertical direction from the nozzle hole of the aerosol agent, defining a maximum value when the aerosol composition is sprayed toward a center of the flat plate under a room temperature condition of 25°C as a spray load, and calculating an average of spray loads measured a plurality of times.

[0055]

( Discharge Rate)

A discharge rate of the aerosol agent is preferably 0.5 to 11 g/sec, more preferably 0.7 to 9 g/sec, and still more preferably 1 to 7 g/sec. When the discharge rate is 0.5 g/sec or more, a sufficient amount of the inorganic powder can be easily attached to the treatment target for repelling and the inorganic powder can be sufficiently attached to the treatment target even when a floor, a wall, or the like, which is the treatment target, is a vertical surface, since diffusibility of the inorganic powder is low. When the discharge rate exceeds 11 g/sec, the diffusibility of the inorganic powder becomes strong, and the user may absorb the sprayed aerosol composition, and thus the discharge rate is preferably 11 g/sec or less.

[0056]

Examples of a method of adjusting the discharge rate include a method of adjusting the size of the nozzle hole of the spray button, a method of adjusting the injection pressure of the aerosol agent, a method of adjusting a stem hole diameter of the aerosol valve, a method of adjusting a pressure of the propellant, and a combination thereof.

[0057]

(Spray Pattern)

In the scaled reptile repellent according to the present invention, an area of the aerosol

composition to be attached on the treatment target is preferably 100 to 1000 cm<sup>2</sup> when the agent is sprayed for 1 second at a speed of 1 m/s from a distance of 50 cm from the floor or wall, which is the treatment target. When the area of an aerosol content to be attached in the treatment target is 100 cm<sup>2</sup> or more, the treatment can be easily performed over a wide range of the treatment target. When the attachment area is 1000 cm<sup>2</sup> or less, the treatment can be appropriately performed only within a range in which the treatment is necessary. The area of the aerosol content to be attached in the treatment target is more preferably 150 cm<sup>2</sup> or more, and still more preferably 200 cm<sup>2</sup> or more, and is more preferably 750 cm<sup>2</sup> or less, and still more preferably 500 cm<sup>2</sup> or less.

[0058]

The scaled reptile repellent according to the present invention is preferably sprayed so that an amount of the aerosol composition to be attached to the floor, the wall, or the like, which is the treatment target, is 0.0125 to 0.75 mg/cm<sup>2</sup>. When the amount of the aerosol composition to be attached to the treatment target is 0.0125 mg/cm<sup>2</sup> or more, the inorganic powder can be attached to the treatment target in an amount capable of exhibiting the repellent effect. When the amount of the aerosol composition to be attached to the treatment target is 0.75 mg/cm<sup>2</sup> or less, the spray particles do not excessively attach to the treatment target, and an appearance is not impaired. The amount of the aerosol composition to be attached to the treatment target is more preferably 0.025 mg/cm<sup>2</sup> or more, and still more preferably 0.05 mg/cm<sup>2</sup> or more, and is more preferably 0.625 mg/cm<sup>2</sup> or less, and still more preferably 0.5 mg/cm<sup>2</sup> or less.

[0059]

In the scaled reptile repellent according to the present invention, an amount of the inorganic powder to be attached to the floor, wall, or the like which is the treatment target is preferably 0.0005 to 0.03 mg/cm<sup>2</sup>. When the amount of the inorganic powder to be attached to the treatment target is 0.0005 mg/cm<sup>2</sup> or more, the sufficient repellent effect on the scaled reptile can be obtained. When the amount of the inorganic powder to be attached is 0.03 mg/cm<sup>2</sup> or less, the spray particles do not excessively attach to the treatment target, and the appearance is not impaired. The amount of the inorganic powder to be attached to the treatment target is more preferably 0.001 mg/cm<sup>2</sup> or more, and still more preferably 0.002 mg/cm<sup>2</sup> or more, and is more preferably 0.025 mg/cm<sup>2</sup> or less, and still more preferably 0.02 mg/cm<sup>2</sup> or less.

[0060]

The scaled reptile repellent according to the present invention is an aerosol agent, and thus the scaled reptile repellent is easy to treat even a place such as a wall or a ceiling, which is hard to reach. The treatment can be performed in such a place, and thus the scaled reptile repellent according to the present invention can be suitably used as a repellent for lizard suborders, and in particular, it is effective for repelling the gecko.

[Examples]

[0061]

Hereinafter, the present invention will be further described with reference to Examples and Comparative Examples, whereas the present invention is not limited to the following Examples.

[0062]

<Test Example 1>

(Examples 1 to 13, 18 to 24 and Comparative Examples 1 to 8)

According to the formulation shown in Table 1 or 2, each component was mixed to prepare a stock solution.

The obtained stock solution was filled into a glass test bottle for aerosol (volume: 100 mL) in an amount of 14.9 g, and a bottle valve, which was included in the glass test bottle, was attached to close the glass test bottle for aerosol. Subsequently, 16.8 g of LPG (pressure at 20°C: 0.34 MPa) as a propellant was pressurized and filled in the glass test bottle to obtain a sample. A volume ratio of the stock solution to the propellant, stock solution:propellant, was 40:60.

[0063]

(Examples 14 to 17)

According to the formulation shown in Table 1, each component was mixed to prepare a stock solution.

The obtained stock solution was filled into a glass test bottle for aerosol (volume: 100 mL) in an amount of 20.1 g, and a bottle valve, which was included in the glass test bottle, was attached to close the glass test bottle for aerosol. Subsequently, 14 g of LPG (pressure at 20°C: 0.34 MPa) as a propellant was pressurized and filled in the glass test bottle to obtain a sample. A volume ratio of the stock solution to the propellant, stock solution:propellant, was 50:50.

[0064]

Raw material components used are as follows.

·Silicon dioxide A: “Tokusil NP” manufactured by Original Silicas Corporation,  
average particle diameter 10.3  $\mu\text{m}$

·Silicon dioxide B: “Sunsphere H-31” manufactured by AGC Si-Tech Co., Ltd.,  
average particle diameter: 3  $\mu\text{m}$

5           ·Talc: “MICRO ACEP-3” manufactured by Nippon Talc Co., Ltd., average particle  
diameter: 5  $\mu\text{m}$

·Calcium carbonate: “SL-1000” manufactured by Takehara Chemical Industrial Co.,  
Ltd., average particle diameter: 3  $\mu\text{m}$

10           ·Trimethylsiloxysilicate A: “BELSIL TMS803” manufactured by Wacker Asahikasei  
Silicone Co., Ltd.

·Trimethylsiloxysilicate B: “MQ-1600” manufactured by Dow Toray Corporation

·Trimethylsiloxysilicate/polypropylsilsequioxane: “MQ-1640” manufactured by  
Dow Toray Corporation

15           ·Methyl propylene glycol acetate: “MFG-AC” manufactured by Nippon Nyukazai  
Co., Ltd.

·Decaglyceryl monooleate: “NIKKOL DECAGLYN 1-OV” manufactured by Nikko  
Chemicals Co., Ltd.

·Alkyl aralkyl-modified silicone: “Release AgentTN” manufactured by Wacker  
AsahiKasei Silicone Co., Ltd.

20           ·Isopropyl alcohol

·Ethanol

·Acetone

·Hexane

·Toluene

25           ·Isoparaffin: Isopar L manufactured by Exxon Mobil Corporation

·Naphthene: “Exxsol D80” manufactured by Exxon Mobil Corporation

[0065]

#### 1. Evaluation of Sedimentation Rate

30           After the sample was turned upside down and shaken five times to disperse the  
inorganic powder, and the sample was placed on a horizontal table, a time until 1/3 of the entire  
liquid layer becomes transparent due to a transparent liquid layer formed by sedimentation of  
the inorganic powder was measured as a sedimentation time, and the sedimentation time was

evaluated according to the following evaluation criteria.

[Evaluation Criteria]

Excellent “A”: sedimentation time was 60 seconds or more

Good “B”: sedimentation time was 16 seconds or more and less than 60 seconds

5 Acceptable “C”: sedimentation time was 12 seconds or more and less than 16 seconds

Unacceptable “D”: sedimentation time was less than 12 seconds

[0066]

## 2. Evaluation of Caking

10 After the sample was turned upside down and shaken five times to disperse the inorganic powder, placed on a horizontal table, and left for one day in an environment of 25°C, the sample was tilted 90 degrees and laid down to confirm a state of the inorganic powder, and evaluated according to the following evaluation criteria.

[Evaluation Criteria]

Excellent “A”: No caking was observed.

15 Good “B”: Caking occurred, but fluidity was observed when a test bottle was tilted.

Unacceptable “C”: Caking occurred, and no fluidity was observed even when the test bottle was tilted.

[0067]

Test results are shown in Tables 1 and 2.

20 [0068]

[Table 1]

Table 1

(Blending amount: w/w%)

|                                                      | Example<br>1 | Example<br>2 | Example<br>3 | Example<br>4 | Example<br>5 | Example<br>6 | Example<br>7 | Example<br>8 | Example<br>9 | Example<br>10 | Example<br>11 | Example<br>12 | Example<br>13 | Example<br>14 | Example<br>15 | Example<br>16 | Example<br>17 |
|------------------------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Silicon dioxide A                                    | 2            | 2            | 2            | 2            | 2            | 2            | 2            | 2            | 2            | 2             | 2             | 0.67          | 3.1           | 1.75          | 1.75          | 1.75          | 3             |
| Silicon dioxide B                                    | -            | -            | -            | -            | -            | -            | -            | -            | -            | -             | -             | -             | -             | -             | -             | -             | -             |
| Talc                                                 | -            | -            | -            | -            | -            | -            | -            | -            | -            | -             | -             | -             | -             | -             | -             | -             | -             |
| Calcium carbonate                                    | -            | -            | -            | -            | -            | -            | -            | -            | -            | -             | -             | -             | -             | -             | -             | -             | -             |
| Trimethylsiloxysilicate A                            | 0.05         | 0.09         | 0.19         | 0.25         | 0.31         | 0.37         | -            | -            | -            | -             | -             | 0.31          | 0.31          | 0.04          | 0.09          | 0.18          | 0.04          |
| Trimethylsiloxysilicate B                            | -            | -            | -            | -            | -            | -            | 0.09         | 0.19         | 0.23         | 0.31          | -             | -             | -             | -             | -             | -             | -             |
| Trimethylsiloxysilicate/<br>polypropylsilsesquioxane | -            | -            | -            | -            | -            | -            | -            | -            | -            | -             | 0.31          | -             | -             | -             | -             | -             | -             |
| Methyl propylene glycol<br>acetate                   | -            | -            | -            | -            | -            | -            | -            | -            | -            | -             | -             | -             | -             | -             | -             | -             | -             |
| Decaglyceryl monooleate                              | -            | -            | -            | -            | -            | -            | -            | -            | -            | -             | -             | -             | -             | -             | -             | -             | -             |
| Alkyl aralkyl-modified<br>silicone                   | -            | -            | -            | -            | -            | -            | -            | -            | -            | -             | -             | -             | -             | -             | -             | -             | -             |
| Isoparaffin                                          | 44.95        | 44.91        | 44.81        | 44.75        | 44.69        | 44.63        | 44.91        | 44.81        | 44.77        | 44.69         | 44.69         | 46.02         | 43.59         | -             | -             | -             | -             |
| Naphthene                                            | -            | -            | -            | -            | -            | -            | -            | -            | -            | -             | -             | -             | -             | 57.21         | 57.16         | 57.07         | 55.96         |
| LPG                                                  | 53           | 53           | 53           | 53           | 53           | 53           | 53           | 53           | 53           | 53            | 53            | 53            | 53            | 41            | 41            | 41            | 41            |
| Total                                                | 100          | 100          | 100          | 100          | 100          | 100          | 100          | 100          | 100          | 100           | 100           | 100           | 100           | 100           | 100           | 100           | 100           |
|                                                      |              |              |              |              |              |              |              |              |              |               |               |               |               |               |               |               |               |
| Inorganic powder/silicone<br>powder (mass ratio)     | 40           | 22.22        | 10.53        | 8            | 6.45         | 5.41         | 22.22        | 10.53        | 8.70         | 6.45          | 6.45          | 2.16          | 10            | 43.75         | 19.44         | 9.72          | 75            |
| Sedimentation rate                                   | 12.14s<br>C  | 14.93s<br>C  | 23.17s<br>B  | 70.12s<br>A  | >90s<br>A    | >90s<br>A    | 17.48s<br>B  | 29.17s<br>B  | 34.31s<br>B  | 55.14s<br>B   | 41.04s<br>B   | >90s<br>A     | 27.94s<br>B   | 16.00s<br>B   | 20.02s<br>B   | 30.85s<br>B   | 41.54s<br>B   |
| Property 1 day after aerosol<br>filling              | A            | A            | A            | A            | A            | B            | A            | A            | A            | A             | A             | A             | A             | A             | A             | A             | A             |

[0069]

[Table 2]

Table 2

(Blending amount: w/w%)

|                                                   | Example 18 | Example 19 | Example 20 | Example 21 | Example 22 | Example 23 | Example 24 | Comparative Example 1 | Comparative Example 2 | Comparative Example 3 | Comparative Example 4 | Comparative Example 5 | Comparative Example 6 | Comparative Example 7 | Comparative Example 8 |
|---------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Silicon dioxide A                                 | -          | -          | -          | -          | -          | -          | -          | 2                     | 2                     | 2                     | 2                     | 2                     | -                     | -                     | -                     |
| Silicon dioxide B                                 | 2          | -          | -          | -          | -          | -          | -          | -                     | -                     | -                     | -                     | -                     | 2                     | -                     | -                     |
| Talc                                              | -          | 2          | 2          | 2          | -          | -          | -          | -                     | -                     | -                     | -                     | -                     | -                     | 2                     | -                     |
| Calcium carbonate                                 | -          | -          | -          | -          | 2          | 2          | 2          | -                     | -                     | -                     | -                     | -                     | -                     | -                     | 2                     |
| Trimethylsiloxysilicate A                         | 0.31       | 0.19       | 0.31       | 0.47       | 0.19       | 0.31       | 0.47       | -                     | -                     | -                     | -                     | -                     | -                     | -                     | -                     |
| Trimethylsiloxysilicate B                         | -          | -          | -          | -          | -          | -          | -          | -                     | -                     | -                     | -                     | -                     | -                     | -                     | -                     |
| Trimethylsiloxysilicate /Polypropylsilsesquioxane | -          | -          | -          | -          | -          | -          | -          | -                     | -                     | -                     | -                     | -                     | -                     | -                     | -                     |
| Methyl propylene glycol acetate                   | -          | -          | -          | -          | -          | -          | -          | -                     | 0.23                  | -                     | -                     | -                     | -                     | -                     | -                     |
| Decaglyceryl monooleate                           | -          | -          | -          | -          | -          | -          | -          | -                     | -                     | 0.23                  | 0.94                  | -                     | -                     | -                     | -                     |
| Alkyl aralkyl-modified silicone                   | -          | -          | -          | -          | -          | -          | -          | -                     | -                     | -                     | -                     | 0.47                  | -                     | -                     | -                     |
| Isoparaffin                                       | 44.69      | 44.81      | 44.69      | 44.53      | 44.81      | 44.69      | 44.53      | 45                    | 44.77                 | 44.77                 | 44.06                 | 44.53                 | 45                    | 45                    | 45                    |
| Naphthene                                         | -          | -          | -          | -          | -          | -          | -          | -                     | -                     | -                     | -                     | -                     | -                     | -                     | -                     |
| LPG                                               | 53         | 53         | 53         | 53         | 53         | 53         | 53         | 53                    | 53                    | 53                    | 53                    | 53                    | 53                    | 53                    | 53                    |
| Total                                             | 100        | 100        | 100        | 100        | 100        | 100        | 100        | 100                   | 100                   | 100                   | 100                   | 100                   | 100                   | 100                   | 100                   |
|                                                   |            |            |            |            |            |            |            |                       |                       |                       |                       |                       |                       |                       |                       |
| Inorganic powder/silicone powder (mass ratio)     | 6.45       | 10.53      | 6.45       | 4.26       | 10.53      | 6.45       | 4.26       | -                     | 8.70                  | 8.70                  | 2.13                  | 4.26                  | -                     | -                     | -                     |
| Sedimentation rate                                | >90s A     | >90s A     | >90s A     | >90s A     | >90s A     | >90s A     | >90s A     | 9.76s D               | 10.90s D              | 14.45s C              | >90s A                | 10.73s D              | 10.41s D              | 5.65s D               | 11.53s D              |
| Property 1 day after aerosol filling              | B          | A          | A          | B          | A          | A          | A          | A                     | A                     | A                     | C                     | A                     | A                     | A                     | A                     |

[0070]

From the results shown in Tables 1 and 2, it was found that the dispersibility of the inorganic powder was improved and the re-dispersibility was also excellent by containing the silicone powder together with the inorganic powder as the active ingredient.

5 [0071]

<Test Example 2>

(Examples 25 to 37 and Comparative Examples 9 to 13)

According to the formulation shown in Table 3 or 4, each component was mixed to prepare a stock solution.

10 The obtained stock solution was filled into a glass test bottle for aerosol (volume: 100 mL) in an amount of 14.9 g, and a bottle valve, which was included in the glass test bottle, was attached to close the glass test bottle for aerosol. Subsequently, 16.8 g of LPG (pressure at 20°C: 0.34 MPa) as a propellant was pressurized and filled in the glass test bottle to obtain a sample. A volume ratio of the stock solution to the propellant, stock solution:propellant, was  
15 40:60.

[0072]

(Examples 38 to 42 and Comparative Example 14)

According to the formulation shown in Table 4, each component was mixed to prepare a stock solution.

20 The obtained stock solution was filled into a glass test bottle for aerosol (volume: 100 mL) in an amount of 20.1 g, and a bottle valve, which was included in the glass test bottle, was attached to close the glass test bottle for aerosol. Subsequently, 14 g of LPG (pressure at 20°C: 0.34 MPa) as a propellant was pressurized and filled in the glass test bottle to obtain a sample. A volume ratio of the stock solution to the propellant, stock solution:propellant, was 50:50.

25 [0073]

#### 1. Evaluation of Sedimentation Rate and Caking

The sedimentation rate and caking were evaluated in the same manner as in Test Example 1. Results are shown in Tables 3 and 4.

[0074]

[Table 3]

Table 3

(Blending amount: w/w%)

|                                                                                     | Example<br>25 | Example<br>26 | Example<br>27 | Example<br>28 | Example<br>29 | Example<br>30 | Example<br>31 | Example<br>32 | Example<br>33 | Example<br>34 | Example<br>35 | Example<br>36 | Example<br>37 |
|-------------------------------------------------------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
| Silicon dioxide A                                                                   | 2             | 2             | 2             | 2             | 2             | 2             | 2             | -             | -             | -             | -             | -             | -             |
| Talc                                                                                | -             | -             | -             | -             | -             | -             | -             | 2             | 2             | 2             | -             | -             | -             |
| Calcium carbonate                                                                   | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | 2             | 2             | 2             |
| Isopropyl alcohol                                                                   | 4.7           | 9.4           | 14            | 18.7          | 23.4          | -             | -             | 4.7           | 9.4           | 18.7          | 4.7           | 9.4           | 18.7          |
| Ethanol                                                                             | -             | -             | -             | -             | -             | 9.4           | -             | -             | -             | -             | -             | -             | -             |
| Acetone                                                                             | -             | -             | -             | -             | -             | -             | 9.4           | -             | -             | -             | -             | -             | -             |
| Hexane                                                                              | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             |
| Toluene                                                                             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             |
| Isoparaffin                                                                         | 40.3          | 35.6          | 31            | 26.3          | 21.6          | 35.6          | 35.6          | 40.3          | 35.6          | 26.3          | 40.3          | 35.6          | 26.3          |
| Naphthene                                                                           | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             | -             |
| LPG                                                                                 | 53            | 53            | 53            | 53            | 53            | 53            | 53            | 53            | 53            | 53            | 53            | 53            | 53            |
| Total                                                                               | 100           | 100           | 100           | 100           | 100           | 100           | 100           | 100           | 100           | 100           | 100           | 100           | 100           |
| Solvent having hydroxy<br>group or ketone<br>group/nonpolar solvent<br>(mass ratio) | 0.12          | 0.26          | 0.45          | 0.71          | 1.08          | 0.26          | 0.26          | 0.12          | 0.26          | 0.71          | 0.12          | 0.26          | 0.71          |
| Sedimentation rate                                                                  | 36.54s<br>B   | >90s<br>A     | >90s<br>A     | >90s<br>A     | >90s<br>A     | 29.88s<br>B   | 13.17s<br>C   | 18.71s<br>B   | 21.64s<br>B   | 49.63s<br>B   | >90s<br>A     | >90s<br>A     | >90s<br>A     |
| Property 1 day after<br>aerosol filling                                             | A             | A             | A             | B             | B             | A             | A             | A             | B             | B             | B             | B             | B             |

[Table 4]

Table 4

(Blending amount: w/w%)

|                                                                            | Example 38  | Example 39 | Example 40 | Example 41 | Example 42 | Comparative Example 9 | Comparative Example 10 | Comparative Example 11 | Comparative Example 12 | Comparative Example 13 | Comparative Example 14 |
|----------------------------------------------------------------------------|-------------|------------|------------|------------|------------|-----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| Silicon dioxide A                                                          | 1.75        | 1.75       | 1.75       | 1.75       | 1.75       | 2                     | 2                      | 2                      | -                      | -                      | 1.75                   |
| Talc                                                                       | -           | -          | -          | -          | -          | -                     | -                      | -                      | 2                      | -                      | -                      |
| Calcium carbonate                                                          | -           | -          | -          | -          | -          | -                     | -                      | -                      | -                      | 2                      | -                      |
| Isopropyl alcohol                                                          | 5.9         | 11.8       | 17.6       | 23.5       | 29.4       | -                     | -                      | -                      | -                      | -                      | -                      |
| Ethanol                                                                    | -           | -          | -          | -          | -          | -                     | -                      | -                      | -                      | -                      | -                      |
| Acetone                                                                    | -           | -          | -          | -          | -          | -                     | -                      | -                      | -                      | -                      | -                      |
| Hexane                                                                     | -           | -          | -          | -          | -          | -                     | 9.4                    | -                      | -                      | -                      | -                      |
| Toluene                                                                    | -           | -          | -          | -          | -          | -                     | -                      | 9.4                    | -                      | -                      | -                      |
| Isoparaffin                                                                | -           | -          | -          | -          | -          | 45                    | 35.6                   | 35.6                   | 45                     | 45                     | -                      |
| Naphthene                                                                  | 51.35       | 45.45      | 39.65      | 33.75      | 27.85      | -                     | -                      | -                      | -                      | -                      | 57.25                  |
| LPG                                                                        | 41          | 41         | 41         | 41         | 41         | 53                    | 53                     | 53                     | 53                     | 53                     | 41                     |
| Total                                                                      | 100         | 100        | 100        | 100        | 100        | 100                   | 100                    | 100                    | 100                    | 100                    | 100                    |
| Solvent having hydroxy group or ketone group/nonpolar solvent (mass ratio) | 0.11        | 0.26       | 0.44       | 0.70       | 1.06       | -                     | 0.26                   | 0.26                   | -                      | -                      | -                      |
| Sedimentation rate                                                         | 58.54s<br>B | >90s<br>A  | >90s<br>A  | >90s<br>A  | >90s<br>A  | 9.76s<br>D            | 7.83s<br>D             | 7.67s<br>D             | 5.65s<br>D             | 11.53s<br>D            | 10.21s<br>D            |
| Property 1 day after aerosol filling                                       | A           | A          | A          | B          | B          | A                     | A                      | A                      | A                      | A                      | A                      |

[0076]

From the results shown in Tables 3 and 4, it was found that the dispersibility of the inorganic powder was improved and the re-dispersibility was also excellent by containing a solvent having a hydroxy group or a ketone group together with the inorganic powder as the active ingredient.

[0077]

<Test Example 3>

(Examples 43 to 44 and Comparative Example 15)

According to the formulation shown in Table 5, each component was mixed to prepare a stock solution.

The obtained stock solution was filled into a glass test bottle for aerosol (volume: 100 mL) in an amount of 14.9 g, and a bottle valve, which was included in the glass test bottle, was attached to close the glass test bottle for aerosol. Subsequently, 16.8 g of LPG (pressure at 20°C: 0.34 MPa) as a propellant was pressurized and filled in the glass test bottle to obtain a sample. A volume ratio of the stock solution to the propellant, stock solution:propellant, was 40:60.

Example 43 and Comparative Example 15 had the same formulation as Example 26 and Comparative Example 9, respectively.

[0078]

#### 1. Evaluation of Sedimentation Rate and Caking

The sedimentation rate and caking were evaluated in the same manner as in Test Example 1. Results are shown in Table 5.

[0079]

#### 2. Gecko Repellent Test

Each sample was treated at a speed of 1 m/s from a distance of 50 cm in a range of at least 2 m<sup>2</sup> with respect to a smooth wall surface with little unevenness in a building in which appearance of a gecko could be confirmed (treated area). An amount of the inorganic powder to be attached in the treated area was 0.0075 mg/cm<sup>2</sup>. For comparison, a range of 2 m<sup>2</sup> of the wall surface in the same building was defined as an untreated area.

One day later, the number of geckos appearing in the treated area and the untreated area was counted, and 30 minutes later, the number of geckos was counted again. An average of the numbers of geckos was determined, and a repelling rate of geckos was calculated based on the following formula (1). Results are shown in Table 5.

Repelling rate (%) =  $\{1 - \frac{\text{the number of geckos in the treated area}}{\text{the number of geckos in the treated area} + \text{the number of geckos in the untreated area}}\} \times 100$  (1)

[0080]

[Table 5]

| 5 | Table 5                              | (Blending amount: w/w%) |               |                           |
|---|--------------------------------------|-------------------------|---------------|---------------------------|
|   |                                      | Example<br>43           | Example<br>44 | Comparative Example<br>15 |
|   | Silicon dioxide A                    | 2                       | 2             | 2                         |
|   | Trimethylsiloxysilicate              | -                       | 0.31          | -                         |
|   | Isopropyl alcohol                    | 9.4                     | -             | -                         |
|   | Isoparaffin                          | 35.6                    | 44.69         | 45                        |
|   | LPG                                  | 53                      | 53            | 53                        |
|   | Total                                | 100                     | 100           | 100                       |
|   | Sedimentation rate                   | >90s<br>A               | 55.14s<br>B   | 9.76s<br>D                |
|   | Property 1 day after aerosol filling | A                       | A             | A                         |
|   | Gecko repelling rate                 | 100%                    | 83%           | 100%                      |

[0081]

From the results shown in Table 5, the dispersibility and re-dispersibility of the aerosol composition were improved by containing at least one of the solvent having a hydroxy group or a ketone group and the silicone powder. Although the silicone powder was slightly inferior in the repellent of the scaled reptile, the repelling rate was 80% or more in all cases.

Further, in Example 43, the repelling rate was about 90% even after 3 weeks from the treatment. From the above, it was found that the excellent repellent effect was continuously exhibited for the scaled reptile.

Examples 43 and 44 are excellent in the dispersibility and the re-dispersibility of the aerosol composition, and thus, it is predicted that Examples 43 and 44 can be easily used not only at the initial stage of use but also at the final stage of use without variations in effects.

[0082]

<Test Example 4>

(Examples 45 and 46 and Comparative Example 16)

According to the formulation shown in Table 6, each component was mixed to prepare a stock solution.

The obtained stock solution was filled in a blister can for aerosol (can volume: 792 mL) in an amount of 149 g, and a valve was attached to close the blister can for aerosol. Subsequently, 168 g of LPG (pressure at 20°C: 0.34 MPa) as a propellant was pressurized and filled in the blister can, and a spray button was attached to obtain a sample. A volume ratio of

the stock solution to the propellant, stock solution:propellant, was 40:60. The valve and the spray button were selected so that a discharge rate per unit was about 1.8 g/sec when the spray was performed for 30 seconds under a condition of 25°C.

Examples 45 and 46 and Comparative Example 16 had the same preparations as Examples 43 and 44 and Comparative Example 15, respectively.

[0083]

#### 1. Gecko Intrusion and Drop Test

An Asian house gecko (*Hemidactylus platyurus*) having a body length of 8 cm or more was used as the gecko.

As a product of the sample at the initial stage of use, an unused sample immediately after the stock solution and the propellant were filled was used.

As a product of the sample at the final stage of use, a sample after five times repeating, an operation of shaking the product at the initial stage of use up and down vigorously five times under the condition of 25°C, continuously an operation of spraying the sample immediately in a stationary state for 30 seconds, and an operation of setting the sample to 25°C after spraying, was used.

Each sample was shaken up and down five times vigorously and then uniformly sprayed, from a distance of 50 cm for 3 seconds for treatment, on an upper half (in a range of 1.0 m × 1.0 m) of a transparent glass plate having a width of 1.0 m and a height of 2.0 m, and after air-drying, the treated glass plate was used as a test area.

The glass plate was placed upright so that the test area was located on an upper side, and the gecko was released to a lower half of the glass plate on which the sample was not treated. Occurrence of dropping was confirmed when the gecko intruded the test area. Results are shown in Table 6.

[0084]

[Table 6]

Table 6

(Blending amount: w/w%)

|                                      |                                    | Example<br>45 | Example<br>46 | Comparative Example<br>16 |
|--------------------------------------|------------------------------------|---------------|---------------|---------------------------|
| Silicon dioxide A                    |                                    | 2             | 2             | 2                         |
| Trimethylsiloxysilicate              |                                    | -             | 0.31          | -                         |
| Isopropyl alcohol                    |                                    | 9.4           | -             | -                         |
| Isoparaffin                          |                                    | 35.6          | 44.69         | 45                        |
| LPG                                  |                                    | 53            | 53            | 53                        |
| Total                                |                                    | 100           | 100           | 100                       |
| Dropping of gecko<br>in treated area | Product in initial<br>stage of use | Drop          | Drop          | Drop                      |
|                                      | Product in final<br>stage of use   | Drop          | Drop          | Not Drop                  |

[0085]

From the results shown in Table 6, it was confirmed that in Example 45 and Example 46, the gecko could not intrude the test area in the case of using not only the sample at the initial stage of use but also the sample at the final stage of use. From this, it was found that the scaled reptile repellent according to the present invention can be used from the initial stage of use to the final stage of use without variation in effects.

[0086]

Although the present invention has been described in detail using specific embodiments, it will be apparent to those skilled in the art that various modifications and variations are possible without departing from the spirit and scope of the present invention. The present application is based on Japanese Patent Application (Japanese Patent Application No. 2019-221168) filed on December 6, 2019, and contents thereof are incorporated herein by reference.

## CLAIMS

1. A scaled reptile repellent,  
wherein a form of the scaled reptile repellent is an aerosol agent in which an aerosol  
5 composition comprising a stock solution and a propellant is filled in a pressure resistant  
container,  
wherein the stock solution comprises an inorganic powder as an active ingredient,  
and at least one of a solvent having a hydroxy group or a ketone group and a silicone powder.
- 10 2. The scaled reptile repellent according to claim 1,  
wherein the solvent having the hydroxyl group or the ketone group is at least one  
selected from a group consisting of alcohols having 2 to 4 carbon atoms and acetone.
3. The scaled reptile repellent according to claim 1 or 2,  
15 wherein a content ratio of the inorganic powder to the silicone powder, inorganic  
powder/silicone powder, is 2 to 75 in terms of a mass ratio.