

DESCRIPTION

TITLE OF THE INVENTION: CHEMICAL AGENT VAPORIZING/DISCHARGING
INSTRUMENT AND CHEMICAL AGENT VAPORIZING/DISCHARGING DEVICE

5

TECHNICAL FIELD

[0001]

The present invention relates to a chemical agent
vaporizing/discharging instrument that comprises a chemical
agent vaporizing/discharging body that vaporizes and discharges
a volatile chemical agent, and to a vaporizing/discharging
container that houses the chemical agent vaporizing/discharging
body, and a chemical agent vaporizing/discharging device
comprising the chemical agent vaporizing/discharging instrument.

15

BACKGROUND ART

[0002]

For example, a chemical agent vaporizing/discharging
instrument has been used for vaporizing and discharging a
volatile chemical agent such as a fragrance, deodorant,
repellent, or insecticide (see, for example, Patent Documents 1
to 3).

[0003]

Patent Documents 1 to 3 disclose a chemical agent
vaporizing/discharging instrument comprising a chemical agent
vaporizing/discharging body that vaporizes and discharges a

volatile chemical agent, and a vaporizing/discharging container that houses the chemical agent vaporizing/discharging body. In this chemical agent vaporizing/discharging instrument, the vaporizing/discharging container has an air passage surface section in which an opening for connecting the outside and inside of the vaporizing/discharging container is formed.

CITATION LIST

PATENT LITERATURE

10 [0004]

Patent Document 1: Japanese Unexamined Patent Application Publication No. 2017-18034

Patent Document 2: Japanese Unexamined Patent Application Publication No. 2011-235901

15 Patent Document 3: Japanese Unexamined Patent Application Publication No. S58-46958

SUMMARY OF INVENTION

TECHNICAL PROBLEM

20 [0005]

The chemical agent vaporizing/discharging instruments disclosed in Patent Documents 1 to 3 do not have any structure that actively guides air that is caused by the wind to flow toward the vaporizing/discharging container, to the vaporizing/discharging surface. Therefore, there is room for improvement in taking more air into the container.

[0006]

With the above problem in mind, the present invention has been made. It is an object of the present invention to provide a chemical agent vaporizing/discharging instrument and chemical agent vaporizing/discharging device that are capable of taking more air into a vaporizing/discharging container.

SOLUTION TO PROBLEM

[0007]

10 A characteristic feature of a chemical agent vaporizing/discharging instrument according to the present invention for solving the above problem is a chemical agent vaporizing/discharging instrument comprising: a chemical agent vaporizing/discharging body that vaporizes and discharges a volatile chemical agent; and a vaporizing/discharging container that houses the chemical agent vaporizing/discharging body, wherein

the vaporizing/discharging container includes

20 an air passage surface section having a communication opening connecting the outside and inside of the vaporizing/discharging container, and

 a protrusion section protruding outward and obliquely with respect to the air passage surface section.

[0008]

25 With the chemical agent vaporizing/discharging instrument thus configured, a portion of air flowing toward the

vaporizing/discharging container that flows toward the air passage surface section in which the communication opening is formed is directly taken into the vaporizing/discharging container through the communication opening. Meanwhile, air
5 flowing toward the protrusion section protruding outward and obliquely with respect to the air passage surface section, flows along the protrusion section to the air passage surface section by the guide function of the protrusion section, and is then taken into the vaporizing/discharging container through the
10 communication opening. Thus, air flowing toward the air passage surface section and air flowing toward the protrusion section are taken into the vaporizing/discharging container through the communication opening formed in the air passage surface section. As a result, a larger amount of air can be taken into the
15 vaporizing/discharging container.

[0009]

In the chemical agent vaporizing/discharging instrument of the present invention,

the vaporizing/discharging container is preferably in the
20 shape of a column having opposite surfaces, and

the air passage surface section is preferably disposed in each of the opposite surfaces.

[0010]

With the chemical agent vaporizing/discharging instrument
25 thus configured, air flowing toward one of air passage surface sections disposed in opposite surfaces of the

vaporizing/discharging container and the protrusion section protruding outward and obliquely with respect to that air passage surface section is taken into the vaporizing/discharging container as described above. The air thus taken into the
5 vaporizing/discharging container receives the chemical agent, and is then released through the communication opening in the other air passage surface section of the vaporizing/discharging container. At this time, the chemical agent-containing air thus released flows along the protrusion section protruding outward
10 and obliquely with respect to the other air passage surface section to a larger outside region, by the guide function of the protrusion section. As a result, a larger amount of chemical agent-containing air can be caused to diffuse into a larger region outside the vaporizing/discharging container, so that the
15 chemical agent can be more efficiently vaporized and discharged.
[0011]

In the chemical agent vaporizing/discharging instrument of the present invention,

the protrusion section preferably has a sloping angle of
20 110 to 165 degrees with respect to the air passage surface section.
[0012]

As the sloping angle of the protrusion section with respect to the air passage surface section approaches 180
25 degrees, an air intake region for air flowing toward the vaporizing/discharging container can be increased. In this

case, however, the guide function of the protrusion section is not sufficiently exhibited, and the amount of air flowing along the protrusion section to the air passage surface section is reduced, resulting in a decrease in the amount of air that is
5 taken into the housing portion. Meanwhile, as the sloping angle of the protrusion section with respect to the air passage surface section approaches 90 degrees, the air intake region is reduced, resulting in a decrease in the amount of air that is taken into the housing portion. With the chemical agent
10 vaporizing/discharging instrument thus configured, the sloping angle of the protrusion section with respect to the air passage surface section is set to 110 to 165 degrees. As a result, while a sufficient air intake region is ensured, the guide function of the protrusion section can be sufficiently exhibited, so that a
15 larger amount of air can be reliably taken into the vaporizing/discharging container.

[0013]

In the chemical agent vaporizing/discharging instrument of the present invention,
20 the protrusion section preferably has a concave sloping surface curved inward.

[0014]

With the chemical agent vaporizing/discharging instrument thus configured, air flowing toward the protrusion section
25 smoothly flows along the concave sloping surface curved inward to the air passage surface section. Therefore, air can be

efficiently taken into the vaporizing/discharging container.

[0015]

In the chemical agent vaporizing/discharging instrument of the present invention,

5 the protrusion section is preferably provided at least at a pedestal of the vaporizing/discharging container that is located at a lower position in a state in which the vaporizing/discharging container is placed.

[0016]

10 With the chemical agent vaporizing/discharging instrument thus configured, the protrusion section is provided at least at a pedestal of the vaporizing/discharging container that is located at a lower position in a state in which the vaporizing/discharging container is placed, and therefore, the
15 stability of the vaporizing/discharging container can be enhanced in a state in which the vaporizing/discharging container is placed.

[0017]

In the chemical agent vaporizing/discharging instrument
20 of the present invention,

 the communication opening is preferably formed so as to extend in a vertical direction in a state in which the vaporizing/discharging container is placed.

[0018]

25 With the chemical agent vaporizing/discharging instrument thus configured, the communication opening is formed so as to

extend in a vertical direction in a state in which the vaporizing/discharging container is placed, so that air flowing from the protrusion section to the air passage surface section can be caused to reliably flow along the communication opening, and therefore, air can be efficiently taken into the vaporizing/discharging container.

[0019]

In the chemical agent vaporizing/discharging instrument of the present invention,

the protrusion section is preferably provided with a flow regulation fin that regulates airflow such that air flows toward the communication opening.

[0020]

With the chemical agent vaporizing/discharging instrument thus configured, the flow regulation fin regulates airflow such that air flows toward the communication opening, and therefore, air flowing toward the air passage surface section can be reliably guided to the communication opening.

[0021]

Next, a characteristic feature of a chemical agent vaporizing/discharging device according to the present invention for solving the above problem is a chemical agent vaporizing/discharging device comprising:

a plurality of the chemical agent vaporizing/discharging instruments that are linked.

[0022]

With the chemical agent vaporizing/discharging device thus configured, vaporization and discharging performance can be easily adjusted by adjusting the number of chemical agent vaporizing/discharging instruments that are linked.

5 [0023]

In the chemical agent vaporizing/discharging device of the present invention,

the plurality of chemical agent vaporizing/discharging instruments are preferably allowed to rotate relative to each other through a linker.

[0024]

With the chemical agent vaporizing/discharging device thus configured, the chemical agent vaporizing/discharging instruments have a linker, and adjacent chemical agent vaporizing/discharging instruments are allowed to rotate relative to each other through the linker. The area of installation can be increased by linkage of a plurality of chemical agent vaporizing/discharging instruments. In addition, adjacent chemical agent vaporizing/discharging instruments can be arranged to be crosslinked. Therefore, the stability of the chemical agent vaporizing/discharging device can be enhanced in a state in which the chemical agent vaporizing/discharging device is placed. In addition, even when the direction in which air flows changes, the probability that air is taken into the vaporizing/discharging container of any of the plurality of chemical agent vaporizing/discharging instruments can be

increased, so that the chemical agent can be stably and efficiently vaporized and discharged.

BRIEF DESCRIPTION OF DRAWINGS

5 [0025]

[FIG. 1] FIG. 1 is an external view of a chemical agent vaporizing/discharging instrument according to an embodiment of the present invention.

10 [FIG. 2] FIG. 2 is a diagram for describing protrusion sections.

[FIG. 3] FIG. 3 is a diagram for describing an air intake operation and the like of a chemical agent vaporizing/discharging instrument in an upright position.

15 [FIG. 4] FIG. 4 is a diagram for describing the air intake operation and the like of a chemical agent vaporizing/discharging instrument in a horizontal position.

[FIG. 5] FIG. 5 is a plan view of a chemical agent vaporizing/discharging device according to an embodiment of the present invention.

20 [FIG. 6] FIG. 6 is a diagram for describing a chemical agent vaporizing/discharging instrument according to alternative embodiment 1.

[FIG. 7] FIG. 7 is a diagram for describing a chemical agent vaporizing/discharging instrument according to alternative
25 embodiment 2.

DESCRIPTION OF EMBODIMENTS

[0026]

The present invention will be described below with reference to the accompanying drawings. It should be noted that
5 the present invention is in no way intended to be limited to structures described in embodiments below and the drawings.

[0027]

<Overall Configuration>

FIG. 1 is an external view of a chemical agent
10 vaporizing/discharging instrument 1 according to an embodiment of the present invention. FIG. 1(a) is a perspective front view thereof. FIG. 1(b) is a perspective rear view thereof. FIG. 1(c) is a view thereof taken in a direction indicated by arrow A in FIG. 1(a). As illustrated in FIG. 1(a), the chemical agent
15 vaporizing/discharging instrument 1 of this embodiment comprises a chemical agent vaporizing/discharging body 2 that vaporizes and discharges a volatile chemical agent, and a vaporizing/discharging container 3 that houses the chemical agent vaporizing/discharging body 2. Although the
20 vaporizing/discharging container 3 can, for example, be produced by a known resin molding technique such as injection molding using a resin as a raw material, the present invention is not limited to this. Although not described in greater detail with reference to the drawings, the vaporizing/discharging container
25 3 is, for example, provided with an insertion opening (not illustrated) through which the chemical agent

vaporizing/discharging body 2 can be inserted into or removed from a housing portion 3a, and an opening/closing structure (not illustrated) that opens and closes the insertion opening in accordance with an operation of attaching and removing, sliding, or the like a lid (not illustrated) for closing the insertion opening.

[0028]

<Volatile Chemical Agent>

As the volatile chemical agent, an insecticide, repellent, antifungal agent, antimicrobial agent, fragrance, deodorant, synergist, and the like can be used alone or in combination. The volatile chemical agent is not particularly limited. For example, in order to control or repel flying insect pests such as mosquitos, Chironomidae, and drain flies, a pyrethroid compound is preferably used as the volatile chemical agent. In particular, pyrethroid compounds that vaporize at room temperature such as metofluthrin, profluthrin, empenethrin, and transfluthrin, which have high vaporization performance and flying insect pest controlling effect, are preferable. It should be noted that the volatile chemical agent may be used in combination with known poorly volatile chemical agents and the like.

[0029]

<Chemical Agent Vaporizing/Discharging Body>

The chemical agent vaporizing/discharging body 2 may, for example, be impregnated with the volatile chemical agent by

immersion, kneading, or the like to hold the volatile chemical agent in a manner that allows the volatile chemical agent to be vaporized and discharged. Examples of a material for the chemical agent vaporizing/discharging body 2 include paper, pulp, natural fibers, synthetic fibers, resin bodies, resin sheets, inorganic and organic porous bodies, and gel bodies. As a technique for impregnating the chemical agent vaporizing/discharging body 2 with the chemical agent, immersing a resin sheet in the chemical agent is simple. Kneading a resin together with the volatile chemical agent is preferable because it is easy to control the sustained release of the volatile chemical agent during use, the vaporized and discharged amount of the chemical agent is stable, and the chemical agent is inhibited from flowing away due to water in the rain or the like when the chemical agent vaporizing/discharging body 2 is used outdoors. The impregnation technique is not particularly limited. Examples of the resin of the resin body and resin sheet include polyethylene, polypropylene, polyvinyl alcohol, polyvinyl acetate, polybutadiene, polyisoprene, ethylene-vinyl acetate copolymer, ethylene-methyl methacrylate copolymer, and styrene-butadiene copolymer. The form of the chemical agent vaporizing/discharging body 2 may be a sheet, granules, a three-dimensional object, or the like, and is not particularly limited. In order to improve the vaporizing and discharging efficiency of the volatile chemical agent, a honeycomb structure, perforated structure, two- or three-dimensional mesh structure, or the

like, may be employed, for example.

[0030]

<Vaporizing/Discharging Container>

As illustrated in FIGS. 1(a) and 1(b), the
5 vaporizing/discharging container 3 is in the shape of a column
having two pairs of opposite surfaces (a front surface section
11 and a rear surface section 12 (first pair) and a right side
surface section 13 and a left side surface section 14 (second
pair), which are described below). The vaporizing/discharging
10 container 3 comprises a thin rectangular cuboid-shaped container
body 4 that is higher than it is deep (the vertical length is
long and the depth is short), and a pair of end structures 5A
and 5B that are linked to one end (upper end) and the other end
(lower end), respectively, of the container body 4. Although in
15 this example, the vaporizing/discharging container 3 (container
body 4) is a columnar body having a rectangular cross-section,
the present invention is not limited to this. For example, the
vaporizing/discharging container 3 (container body 4) may be a
columnar body having a rounded rectangular cross-section.

20 [0031]

<Container Body>

The container body 4 has the front surface section 11 (see
FIG. 1(a)), the rear surface section 12 (see FIG. 1(b)), the
right side surface section 13 (see FIG. 1(a)), and the left side
25 surface section 14 (see FIG. 1(c)). Both of the front surface
section 11 and the rear surface section 12 are formed in the

shape of a rectangle that is long in the vertical direction. The front surface section 11 and the rear surface section 12 are disposed opposite each other with a predetermined space interposed therebetween in the horizontal direction. As
5 illustrated in FIGS. 1(a) and 1(c), both of the right side surface section 13 and the left side surface section 14 are formed in the shape of a rectangle (strip-shaped) that is long in the vertical direction. The right side surface section 13 and the left side surface section 14 are disposed opposite each
10 other with a predetermined space interposed therebetween, at both side edges of the front surface section 11 and the rear surface section 12, and are orthogonal to the front surface section 11 and the rear surface section 12. In the container body 4, the side edges of the front surface section 11 and the
15 rear surface section 12 are integrally joined to the side edges of the right side surface section 13 and the left side surface section 14.

[0032]

<Air Passage Surface Section and Communication Opening>

20 The front surface section 11, the rear surface section 12, the right side surface section 13, and the left side surface section 14 each correspond to the "air passage surface section" of the present invention. The front surface section 11 and the rear surface section 12 are disposed in opposite surfaces of the
25 vaporizing/discharging container 3. The right side surface section 13 and the left side surface section 14 are disposed in

opposite surfaces of the vaporizing/discharging container 3, and are perpendicular to the front surface section 11 and the rear surface section 12. As illustrated in FIG. 1(a), the front surface section 11 is perforated, e.g., is provided with a plurality of (in this example, eight) communication openings 21 that are in the shape of a rectangle elongated in the horizontal direction (left-right direction). The communication openings 21 are arranged in the vertical direction with a predetermined space interposed between each communication opening 21 so as to connect the outside and inside of the vaporizing/discharging container 3. As illustrated in FIG. 1(b), the rear surface section 12 is perforated, e.g., is provided with a plurality of (in this example, eight) communication openings 22 having a shape similar to that of the communication openings 21. The communication openings 22 are provided so as to connect the outside and inside of the vaporizing/discharging container 3. As illustrated in FIG. 1(a), the right side surface section 13 is perforated, e.g., is provided with a plurality of (in this example, eight) communication openings 23 that are in the shape of a rectangle that is slightly longer in the depth direction (front-back direction) than it is high. The communication openings 23 are arranged in the vertical direction with a predetermined space interposed between each communication opening 23 so as to connect the outside and inside of the vaporizing/discharging container 3. As illustrated in FIG. 1(c), the left side surface section 14 is perforated, e.g., is provided with a plurality of (in this

example, eight) communication openings 24 having a shape similar to that of the communication openings 23. The communication openings 24 are provided so as to connect the outside and inside of the vaporizing/discharging container 3.

5 [0033]

<Protrusion Section>

As illustrated in FIG. 1(a), the end structures 5A and 5B form an upper and a lower portion, respectively, of the vaporizing/discharging container 3 in a state in which the vaporizing/discharging container 3 is placed on a placement surface FL. The end structures 5A and 5B serve as upper and lower pedestals, respectively. In particular, the end structure 5B, which serves as the lower pedestal, on which the vaporizing/discharging container 3 is installed, has a protrusion section 6 described below to enhance the stability of the vaporizing/discharging container 3 in its placed state. The end structures 5A and 5B are symmetric to each other with respect to the horizontal direction. The end structures 5A and 5B each have a protrusion section 6 that is integrally formed with the container body 4, and an end plate 7 that is integrally formed with the protrusion section 6. It should be noted that the end structures 5A and 5B may not necessarily be symmetric to each other with respect to the horizontal direction, and may be asymmetric to each other. The protrusion section 6 includes a front protrusion section 31 (see FIG. 1(a)), a rear protrusion section 32 (see FIG. 1(b)), a right side protrusion section 33

(see FIG. 1(a)), and a left side protrusion section 34 (see FIG. 1(c)). As illustrated in FIG. 1(a), the front protrusion section 31 is formed so as to protrude outward and obliquely with respect to the front surface section 11. As illustrated in FIG. 1(b), the rear protrusion section 32 is formed so as to protrude outward and obliquely with respect to the rear surface section 12. As illustrated in FIGS. 1(a) and 1(b), the right side protrusion section 33 is formed so as to protrude outward and obliquely with respect to the right side surface section 13. As illustrated in FIG. 1(c), the left side protrusion section 34 is formed so as to protrude outward and obliquely with respect to the left side surface section 14.

[0034]

FIG. 2 is a diagram for describing the protrusion sections 6. FIG. 2(a) is a diagram illustrating the front protrusion section 31 in the case in which the protrusion section 6 has a flat surface. FIG. 2(b) is a diagram illustrating the left side protrusion section 34 in the case in which the protrusion section 6 has a flat surface. FIG. 2(c) is a diagram illustrating the front protrusion section 31 in the case in which the protrusion section 6 has a concave surface. FIG. 2(d) is a diagram illustrating the left side protrusion section 34 in the case in which the protrusion section 6 has a concave surface. It should be noted that the front protrusion section 31 and the rear protrusion section 32 have similar structures, and therefore, by describing the structure of the front protrusion section 31 with

reference to FIGS. 2(a) and 2(c), the structure of the rear protrusion section 32 is substantially described. In addition, the right side protrusion section 33 and the left side protrusion section 34 have similar structure, and therefore, by describing
5 the structure of the left side protrusion section 34 with reference to FIGS. 2(b) and 2(d), the right side protrusion section 33 is substantially described.

[0035]

As illustrated in FIG. 2(a), the front protrusion section
10 31 has a flat sloping surface 41 that is formed in a flat shape along the direction in which the front protrusion section 31 protrudes (the direction indicated by the arrow symbol D in FIG. 2(a)). As illustrated in FIG. 2(b), as with the front protrusion section 31, the left side protrusion section 34 has a flat
15 sloping surface 42 that is formed in a flat shape along the direction in which the left side protrusion section 34 protrudes (the direction indicated by the arrow symbol D in FIG. 2(b)).

[0036]

Here, in FIG. 2(a), the sloping angle of the front
20 protrusion section 31 with respect to the front surface section 11 (the angle between the outer surface of the front surface section 11 and the flat sloping surface 41 of the front protrusion section 31) is denoted as θ_1 . In FIG. 2(b), the sloping angle of the left side protrusion section 34 with respect
25 to the left side surface section 14 (the angle between the outer surface of the left side surface section 14 and the flat sloping

surface 42 of the left side protrusion section 34) is denoted as θ_2 .

[0037]

As the sloping angles θ_1 and θ_2 in FIGS. 2(a) and 2(b) approach 180 degrees, an air intake region for air flowing toward the vaporizing/discharging container 3 can be increased. In this case, however, the guide function of the front protrusion section 31 and the left side protrusion section 34 is not sufficiently exhibited, and the amount of air flowing along the front protrusion section 31 and the left side protrusion section 34 to the front surface section 11 and the left side surface section 14 is reduced, resulting in a decrease in the amount of air that is taken into the housing portion 3a (see FIG. 1(a)). Meanwhile, as the sloping angles θ_1 and θ_2 approach 90 degrees, the air intake region is reduced, resulting in a decrease in the amount of air that is taken into the housing portion 3a.

[0038]

Therefore, in this embodiment, the sloping angles θ_1 and θ_2 are preferably set to 110 to 165 degrees, more preferably 120 to 150 degrees. As a result, the guide function of the front protrusion section 31 and the left side protrusion section 34 can be sufficiently exhibited while a sufficient air intake region is ensured, so that a larger amount of air can be reliably taken into the vaporizing/discharging container 3 (the housing portion 3a (see FIG. 1(a))). In this example, the sloping angle θ_1 is set to about 135 degrees, and the sloping angle θ_2 is set

to about 140 degrees.

[0039]

The form of the front protrusion section 31 is not limited to the form in which the flat sloping surface 41 is provided as illustrated in FIG. 2(a). For example, as illustrated in FIG. 2(c), the front protrusion section 31 may have a concave sloping surface 43 that is curved inward. More specifically, the concave sloping surface 43 is curved in a direction crossing (perpendicular to) the direction in which the front protrusion section 31 protrudes (the direction indicated by the arrow symbol D in FIG. 2(c)). Similarly, the form of the left side protrusion section 34 is not limited to the form in which the flat sloping surface 42 is provided as illustrated in FIG. 2(b). For example, as illustrated in FIG. 2(d), the left side protrusion section 34 may have a concave sloping surface 44 that is curved inward. More specifically, the concave sloping surface 44 is curved in a direction crossing (perpendicular to) the direction in which the left side protrusion section 34 protrudes (the direction indicated by the arrow symbol D in FIG. 2(d)). By such a structure having the concave sloping surface 43, 44, air flowing toward the protrusion section 31, 34 can be caused to flow more smoothly along the concave sloping surface 43, 44 to the air passage surface section (the front surface section 11, the left side surface section 14), so that air can be efficiently taken into the vaporizing/discharging container 3 (the housing portion 3a (see FIG. 1(a))).

[0040]

Here, in FIG. 2(c), the sloping angle of the front protrusion section 31 with respect to the front surface section 11 is regarded as the angle between a straight line La that is in contact with two end edges of the concave sloping surface 43 that are separated in the direction in which the front protrusion section 31 protrudes (the direction indicated by the arrow symbol D in FIG. 2(c)), and the outer surface of the front surface section 11, and is denoted as θ_3 . In FIG. 2(d), the sloping angle of the left side protrusion section 34 with respect to the left side surface section 14 is regarded as the angle between a straight line Lb that is in contact with two end edges of the concave sloping surface 44 that are separated in the direction in which the left side protrusion section 34 protrudes (the direction indicated by the arrow symbol D in FIG. 2(d)), and the outer surface of the left side surface section 14, and is denoted as θ_4 .

[0041]

As with the sloping angles θ_1 and θ_2 , the sloping angles θ_3 and θ_4 are preferably set to 110 to 165 degrees, more preferably 120 to 150 degrees, taking into account the balance between the air intake region with respect to the sloping angle and the guide function. As a result, the guide function of the front protrusion section 31 and the left side protrusion section 34 can be sufficiently exhibited while a sufficient air intake region is ensured, so that a larger amount of air can be reliably

taken into the vaporizing/discharging container 3 (the housing portion 3a (see FIG. 1(a))). In this example, the sloping angle θ_3 is set to about 135 degrees, and the sloping angle θ_4 is set to about 140 degrees.

5 [0042]

FIG. 3 is a diagram for describing an air intake operation and the like of the chemical agent vaporizing/discharging instrument 1 in an upright position. FIG. 3(a) is a diagram for describing the air intake operation and chemical agent vaporizing/discharging operation of the chemical agent vaporizing/discharging instrument 1 when air flows toward the left side surface of the vaporizing/discharging container 3. FIG. 3(b) is a diagram for describing the air intake operation and chemical agent vaporizing/discharging operation of the chemical agent vaporizing/discharging instrument 1 when air flows toward the front surface of the vaporizing/discharging container 3.

[0043]

As illustrated in FIG. 3(b), when air flows toward the front surface of the vaporizing/discharging container 3 due to the wind, a portion of the air flowing toward the vaporizing/discharging container 3 that flows toward the front surface section 11 is directly taken into the vaporizing/discharging container 3 through the communication openings 21 (see FIG. 1(a)). Meanwhile, air flowing toward the pair of front protrusion sections 31, which protrude outward and

obliquely with respect to the front surface section 11, flows along the pair of front protrusion sections 31 to the front surface section 11 by the guide function of the pair of front protrusion sections 31, and is then taken into the vaporizing/discharging container 3 through the communication openings 21 (see FIG. 1(a)). Thus, air flowing toward the front surface section 11 and air flowing toward the pair of front protrusion sections 31 are taken into the vaporizing/discharging container 3 through the communication openings 21 formed in the front surface section 11 (see FIG. 1(a)). As a result, a larger amount of air can be taken into the vaporizing/discharging container 3.

[0044]

The air thus taken in the vaporizing/discharging container 3 receives the chemical agent, and is then released through the communication openings 22 (see FIG. 1(b)) in the rear surface section 12, which is disposed opposite the front surface section 11. At this time, the released air containing the chemical agent flows to a larger outside region along the pair of rear protrusion sections 32, which protrude outward and obliquely with respect to the rear surface section 12, by the guide function of the pair of rear protrusion sections 32. As a result, a larger amount of air containing the chemical agent can be caused to diffuse into a larger region outside the vaporizing/discharging container 3, so that the chemical agent can be more efficiently vaporized and discharged.

[0045]

It should be noted that when air flows toward the rear surface of the vaporizing/discharging container 3, the air intake side and the chemical agent vaporizing/discharging side are reversed compared to the example of FIG. 3(b), and the air intake operation and the chemical agent vaporizing/discharging operation are similar to those illustrated in FIG. 3(b). Therefore, the air intake operation and chemical agent vaporizing/discharging operation performed when air flows toward the rear surface of the vaporizing/discharging container 3 will not be described.

[0046]

Next, as illustrated in FIG. 3(a), when air flows toward the left side surface of the vaporizing/discharging container 3 due to the wind, a portion of the air flowing toward the left side surface of the vaporizing/discharging container 3 that flows toward the left side surface section 14 is directly taken into the vaporizing/discharging container 3 through the communication openings 24 (see FIG. 1(c)). Meanwhile, air flowing toward the pair of left side protrusion sections 34, which protrude outward and obliquely with respect to the left side surface section 14, flows along the pair of left side protrusion sections 34 to the left side surface section 14 by the guide function of the pair of left side protrusion sections 34, and is then taken into the vaporizing/discharging container 3 through the communication openings 24 (see FIG. 1(c)). Thus,

air flowing toward the left side surface section 14 and air flowing toward the pair of left side protrusion sections 34 are taken into the vaporizing/discharging container 3 through the communication openings 24 (see FIG. 1(c)) formed in the left side surface section 14. Therefore, a larger amount of air can be taken into the vaporizing/discharging container 3.

[0047]

The air thus taken in the vaporizing/discharging container 3 receives the chemical agent, and is then released through the communication openings 23 (see FIG. 1(a)) in the right side surface section 13, which is disposed opposite the left side surface section 14. At this time, the released air containing the chemical agent flows to a larger outside region along the pair of right side protrusion sections 33, which protrude outward and obliquely with respect to the right side surface section 13, by the guide function of the pair of right side protrusion sections 33. As a result, a larger amount of air containing the chemical agent can be caused to diffuse into a larger region outside the vaporizing/discharging container 3, so that the chemical agent can be more efficiently vaporized and discharged.

[0048]

It should be noted that when air flows toward the right side surface of the vaporizing/discharging container 3, the air intake side and the chemical agent vaporizing/discharging side are reversed compared to the example of FIG. 3(a), and the air intake operation and the chemical agent vaporizing/discharging

operation are similar to those illustrated in FIG. 3(a). Therefore, the air intake operation and chemical agent vaporizing/discharging operation performed when air flows toward the right side surface of the vaporizing/discharging container 3 will not be described.

[0049]

FIG. 4 is a diagram for describing the air intake operation and the like of the chemical agent vaporizing/discharging instrument 1 in a horizontal position.

In the case where the chemical agent vaporizing/discharging instrument 1 is changed from the upright position in which the chemical agent vaporizing/discharging instrument 1 is placed in a vertical position with respect to the placement surface FL as illustrated in FIG. 3(b) to the position (horizontal position) in which the chemical agent vaporizing/discharging instrument 1 is, for example, laid on the rear surface section 12 with the rear surface section 12 facing the placement surface FL as illustrated in FIG. 4, when air flows toward the front surface of the vaporizing/discharging container 3 (the upper surface of the vaporizing/discharging container 3 in a horizontal position as illustrated in FIG. 4) due to the wind, a portion of air flowing toward the front surface of the vaporizing/discharging container 3 that flows toward the front surface section 11 is directly taken into the vaporizing/discharging container 3 through the communication openings 21 (see FIG. 1(a)). Meanwhile, air flowing toward the pair of front protrusion

sections 31, which protrude outward and obliquely with respect to the front surface section 11, flows along the pair of front protrusion sections 31 to the front surface section 11 by the guide function of the pair of front protrusion sections 31, and is then taken into the vaporizing/discharging container 3 through the communication openings 21 (see FIG. 1(a)).

[0050]

As illustrated in FIG. 4, the pair of end structures 5A and 5B, which include the pair of rear protrusion sections 32, which protrude outward and obliquely with respect to the rear surface section 12, ensure a space S between the rear surface section 12 and the placement surface FL. Therefore, the air thus taken in the vaporizing/discharging container 3 receives the chemical agent, and is then released from the communication openings 22 (see FIG. 1(b)), which are provided in the rear surface section 12, through the space S. Thus, even when the chemical agent vaporizing/discharging instrument 1 is in a horizontal position, air containing the chemical agent can be caused to diffuse into the region outside the vaporizing/discharging container 3.

[0051]

FIG. 5 is a plan view of a chemical agent vaporizing/discharging device 50 according to an embodiment of the present invention. FIG. 5(a) is a diagram illustrating a state in which a plurality of chemical agent vaporizing/discharging instruments 1 are linked in a straight

line. FIG. 5(b) is a diagram illustrating a state in which a plurality of chemical agent vaporizing/discharging instruments 1 are linked in the shape of a folding screen (zigzag pattern). As illustrated in FIGS. 5(a) and 5(b), the chemical agent vaporizing/discharging device 50 includes a plurality of (in this example, three) chemical agent vaporizing/discharging instruments 1 that are linked.

[0052]

In the chemical agent vaporizing/discharging devices 50 illustrated in FIGS. 5(a) and 5(b), a linker 60 for linking adjacent chemical agent vaporizing/discharging instruments 1 includes a pair of engagement protrusions 61 and a pair of engagement recesses 62. The pair of engagement protrusions 61 are formed and positioned at both side portions of the end structure 5A in a transverse direction (the direction in which the front surface section 11 and the rear surface section 12 are disposed opposite each other) at an end portion of the end structure 5A in a longitudinal direction (the direction in which the right side surface section 13 and the left side surface section 14 are disposed opposite each other). The pair of engagement recesses 62 are formed and positioned at both side portions of the end structure 5A in the transverse direction at the other end portion of the end structure 5A in the longitudinal direction. The engagement recess 62 is formed in the shape of a ring, a portion of which is removed in the circumferential direction (C-shape). The engagement protrusion 61 is formed in

the shape of a disc (cylinder) that can be elastically engaged with the engagement recess 62.

[0053]

As illustrated in FIG. 5(a), when the pair of engagement
5 recesses 62 of one (on a relatively upper side in FIG. 5(a)) of adjacent chemical agent vaporizing/discharging instruments 1 are engaged with the pair of engagement protrusions 61 of the other chemical agent vaporizing/discharging instrument 1 (on a relatively lower side in FIG. 5(a)), one chemical agent
10 vaporizing/discharging instrument 1 is linked to the other chemical agent vaporizing/discharging instrument 1 in a manner that does not allow these instruments 1 to rotate relative to each other, so that a plurality of chemical agent vaporizing/discharging instruments 1 are linked in a straight
15 line.

[0054]

As illustrated in FIG. 5(b), when one engagement recess 62 of one (on a relatively upper side in FIG. 5(b)) of adjacent chemical agent vaporizing/discharging instruments 1 is engaged
20 with one engagement protrusion 61 of the other chemical agent vaporizing/discharging instrument 1 (on a relatively lower side in FIG. 5(b)) without the other engagement recess 62 and the other engagement protrusion 61 being engaged, one chemical agent vaporizing/discharging instrument 1 is linked to the other
25 chemical agent vaporizing/discharging instrument 1 in a manner that allows these instruments 1 to rotate relative to each other.

When one chemical agent vaporizing/discharging instrument 1 and the other chemical agent vaporizing/discharging instrument 1 are rotated around a portion where the engagement protrusion 61 is engaged with the engagement recess 62 so that one chemical agent vaporizing/discharging instrument 1 is oblique with respect to the other chemical agent vaporizing/discharging instrument 1, a plurality of chemical agent vaporizing/discharging instruments 1 are linked in the shape of a folding screen (in a zigzag pattern).

10 [0055]

The vaporization and discharging performance of the chemical agent vaporizing/discharging devices 50 of FIGS. 5(a) and 5(b) can be easily adjusted by adjusting the number of linked chemical agent vaporizing/discharging instruments 1. In addition, as illustrated in FIG. 5(b), adjacent chemical agent vaporizing/discharging instruments 1 can be rotated around a portion where the engagement protrusion 61 is engaged with the engagement recess 62 so that a plurality of chemical agent vaporizing/discharging instruments 1 are crosslinked. Therefore, the stability of the chemical agent vaporizing/discharging device 50 can be improved in a state in which the chemical agent vaporizing/discharging device 50 is placed. In addition, even when the direction in which air flows changes, the probability that air is taken into the vaporizing/discharging container 3 of any of a plurality of chemical agent vaporizing/discharging instruments 1 can be

increased, so that the chemical agent can be vaporized and discharged stably and efficiently.

[0056]

It should be noted that the linker for linking adjacent
5 chemical agent vaporizing/discharging instruments 1 is not limited to the linker 60. For example, adjacent chemical agent vaporizing/discharging instruments 1 may be linked with a known hinge mechanism, a link, a pin, a locking instrument having a hook shape at either end thereof, or the like.

10 [0057]

Although in the foregoing, the chemical agent vaporizing/discharging instrument and chemical agent vaporizing/discharging device of the present invention have been described based on one embodiment, the present invention is not
15 limited to the configuration described in the above embodiment, and changes and modifications can be made to the embodiment without departing from the scope or spirit of the present invention.

[0058]

20 (Alternative Embodiment 1)

FIG. 6 is a diagram for describing a chemical agent vaporizing/discharging instrument 1A according to alternative embodiment 1. FIG. 6(a) is a front view of the chemical agent vaporizing/discharging instrument 1A. FIG. 6(b) is a right side
25 view of the chemical agent vaporizing/discharging instrument 1A. As illustrated in FIG. 6(a), a plurality of (in this example,

five) communication openings 21 are provided, extending along the direction from a protrusion section 6 (front protrusion section 31) toward an air passage surface section (front surface section 11) (in this example, the top-bottom direction (height direction (vertical direction)) in a state in which the vaporizing/discharging container 3 is placed), with a predetermined space interposed between each communication opening 21 in the left-right direction (communication openings 22 are similarly arranged). As illustrated in FIG. 6(b), a plurality of (in this example, three) communication openings 23 are provided, extending along the direction from a protrusion section 6 (right side protrusion section 33) toward an air passage surface section (right side surface section 13) (in this example, the top-bottom direction (height direction (vertical direction)) in a state in which the vaporizing/discharging container 3 is placed), with a predetermined space interposed between each communication opening 23 in the front-back direction (communication openings 24 are similarly arranged). Thus, the communication openings 21 to 24 are formed, extending along the directions from the protrusion sections 6 toward the air passage surface sections (the front surface section 11, the rear surface section 12, the right side surface section 13, and the left side surface section 14). Therefore, air flowing from the protrusion sections 6 toward the air passage surface sections (the front surface section 11, the rear surface section 12, the right side surface section 13, and the left side surface section

14) can be caused to reliably flow along the communication openings 21 to 24, and can thereby be efficiently taken into the vaporizing/discharging container 3.

[0059]

5 <Flow Regulation Fin>

 The protrusion sections 6 (the front protrusion section 31, the rear protrusion section 32, the right side protrusion section 33, and the left side protrusion section 34) are provided with a predetermined number of flow regulation fins 70 for
10 regulating airflow such that air flows toward the communication openings 21 to 24. A pair of flow regulation fins 70 provided, corresponding to each of the communication openings 21 to 24, are arranged in a tapered pattern in which the distance between the flow regulation fins 70 becomes gradually narrower in the
15 direction from the protrusion section 6 toward the air passage surface section (the front surface section 11, the rear surface section 12, the right side surface section 13, or the left side surface section 14), and the tip ends of the flow regulation fins 70 are positioned close to the opposite side edges in the
20 left-right direction of a lower end portion of a corresponding one of the communication openings 21 to 24. By thus providing the flow regulation fins 70, air flowing toward the air passage surface sections (the front surface section 11, the rear surface section 12, the right side surface section 13, and the left side
25 surface section 14) can be reliably guided by the pairs of flow regulation fins 70 to the communication openings 21 to 24. In

addition, the constriction effect of the pair of flow regulation fin 70 arranged in the tapered pattern that becomes narrower toward the tip end can increase the flow rate of the air. As a result, the air can be efficiently taken into the vaporizing/discharging container 3.

[0060]

Needless to say, the flow regulation fins 70 of FIG. 6 can also be provided to the protrusion section 6 at appropriate positions in the chemical agent vaporizing/discharging instrument 1 of FIG. 3. Although FIG. 6 illustrates an example in which the flow regulation fins 70 are provided, protruding from the surface of the protrusion section 6, the present invention is not limited to this. Although not described in detail in the drawings, a plurality of hollow portions having an appropriate depth with respect to the surface of the protrusion section 6 may be arranged side by side on the protrusion section 6, and a portion between adjacent hollow portions (a portion relatively protruding with respect to the deeper surface of the hollow portion) may be caused to function as a flow regulation fin so as to produce the flow regulation effect, for example.

[0061]

(Alternative Embodiment 2)

FIG. 7 is a diagram for describing a chemical agent vaporizing/discharging instrument 1B according to alternative embodiment 2. FIG. 7(a) is a perspective front view of the chemical agent vaporizing/discharging instrument 1B. FIG. 7(b)

is a perspective rear view of the chemical agent vaporizing/discharging instrument 1B. FIG. 7(c) is a view of the chemical agent vaporizing/discharging instrument 1B taken in a direction indicated by arrow B in FIG. 7(a). It should be noted that the chemical agent vaporizing/discharging instrument 1B of alternative embodiment 2 has substantially the same structure as that of the chemical agent vaporizing/discharging instrument 1 of this embodiment, except for the arrangement of the communication openings 21 to 24.

10 [0062]

In the chemical agent vaporizing/discharging instrument 1B of alternative embodiment 2, the uppermost one of the plurality of communication openings 21 provided in the front surface section 11 is disposed close to the front protrusion section 31 of the upper end structure 5A, and the lowermost communication opening 21 is disposed close to the front protrusion section 31 of the lower end structure 5B. The same applies to the plurality of communication openings 22 to 24. Specifically, the uppermost one of the plurality of communication openings 22 is disposed close to the rear protrusion section 32 of the upper end structure 5A, and the lowermost communication opening 22 is disposed close to the rear protrusion section 32 of the lower end structure 5B. The uppermost one of the plurality of communication openings 23 is disposed close to the right side protrusion section 33 of the upper end structure 5A, and the lowermost communication opening

23 is disposed close to the right side protrusion section 33 of the lower end structure 5B. The uppermost one of the plurality of communication openings 24 is disposed close to the left side protrusion section 34 of the upper end structure 5A, and the lowermost communication opening 24 is disposed close to the left side protrusion section 34 of the lower end structure 5B.

[0063]

In the chemical agent vaporizing/discharging instrument 1B thus configured, air flowing toward the protrusion sections 6 is caused to more easily flow into the uppermost and lowermost ones of the communication openings 21 to 24, by the guide function of the protrusion sections 6, and therefore, a larger amount of air can be more efficiently taken into the vaporizing/discharging container 3. In addition, in the chemical agent vaporizing/discharging instrument 1B, air taken in the vaporizing/discharging container 3 receives the chemical agent, and then more easily flows from the uppermost and lowermost ones of the communication openings 21 to 24 to the protrusion sections 6, and therefore, a larger amount of air containing the chemical agent can be more efficiently vaporized and discharged.

INDUSTRIAL APPLICABILITY

[0064]

The chemical agent vaporizing/discharging instrument and chemical agent vaporizing/discharging device of the present

invention can be used as a device for vaporizing and discharging a fragrance or deodorant, and can also be effectively used, particularly for controlling or repelling flying insect pests such as mosquitos, Chironomidae, and drain flies.

5

REFERENCE SIGNS LIST

[0065]

	1, 1A, 1B	Chemical agent vaporizing/discharging instrument
	2	Chemical agent vaporizing/discharging body
10	3	Vaporizing/discharging container
	5A, 5B	End structure (pedestal)
	6	Protrusion section
	11	Front surface section (air passage surface section)
	12	Rear surface section (air passage surface section)
15	13	Right side surface section (air passage surface section)
	14	Left side surface section (air passage surface section)
	21 to 24	Communication opening
20	31	Front protrusion section
	32	Rear protrusion section
	33	Right side protrusion section
	34	Left side protrusion section
	43, 44	Concave sloping surface
25	50	Chemical agent vaporizing/discharging device
	60	Linker

CLAIMS

[Claim 1] A chemical agent vaporizing/discharging instrument comprising: a chemical agent vaporizing/discharging body that vaporizes and discharges a volatile chemical agent; and a vaporizing/discharging container that houses the chemical agent vaporizing/discharging body, wherein

the vaporizing/discharging container includes

an air passage surface section having a communication opening connecting the outside and inside of the vaporizing/discharging container, and

a protrusion section protruding outward and obliquely with respect to the air passage surface section.

[Claim 2] The chemical agent vaporizing/discharging instrument according to claim 1, wherein

the vaporizing/discharging container is in the shape of a column having opposite surfaces, and

the air passage surface section is disposed in each of the opposite surfaces.

[Claim 3] The chemical agent vaporizing/discharging instrument according to claim 1, wherein

the protrusion section has a sloping angle of 110 to 165 degrees with respect to the air passage surface section.

[Claim 4] The chemical agent vaporizing/discharging
5 instrument according to claim 1,
wherein

the protrusion section has a concave sloping surface curved inward.

10 [Claim 5] The chemical agent vaporizing/discharging
instrument according to claim 1,
wherein

the protrusion section is provided at least at a pedestal of the vaporizing/discharging container that is located at a
15 lower position in a state in which the vaporizing/discharging container is placed.

[Claim 6] The chemical agent vaporizing/discharging
instrument according to claim 1,
20 wherein

the communication opening is formed so as to extend in a vertical direction in a state in which the vaporizing/discharging container is placed.

25 [Claim 7] The chemical agent vaporizing/discharging
instrument according to claim 1,

wherein

the protrusion section is provided with a flow regulation fin that regulates airflow such that air flows toward the communication opening.

5

[Claim 8] A chemical agent vaporizing/discharging device comprising:

a plurality of the chemical agent vaporizing/discharging instruments according to any one of claims 1 to 7 that are
10 linked.

[Claim 9] The chemical agent vaporizing/discharging device according to claim 8, wherein

the plurality of chemical agent vaporizing/discharging
15 instruments are allowed to rotate relative to each other through a linker.