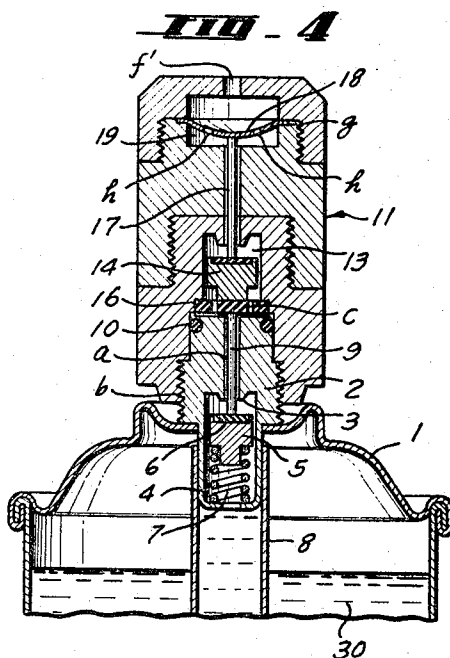
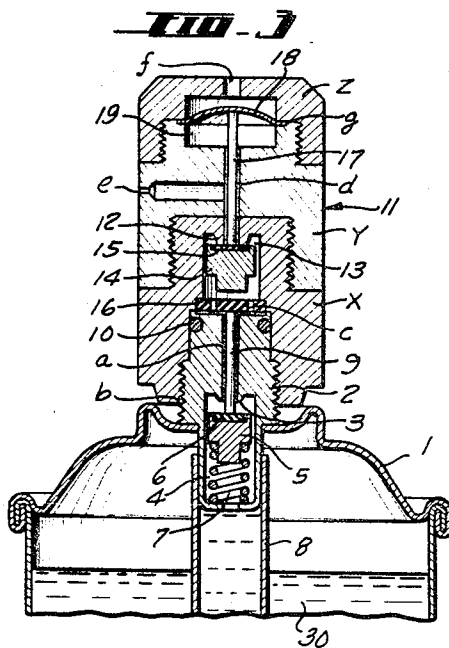
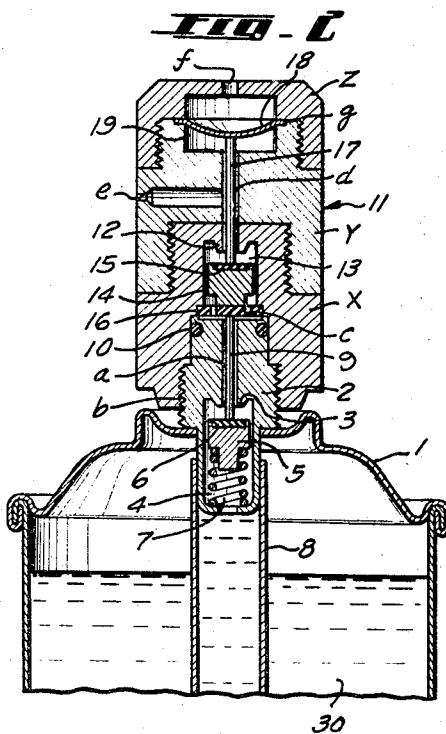
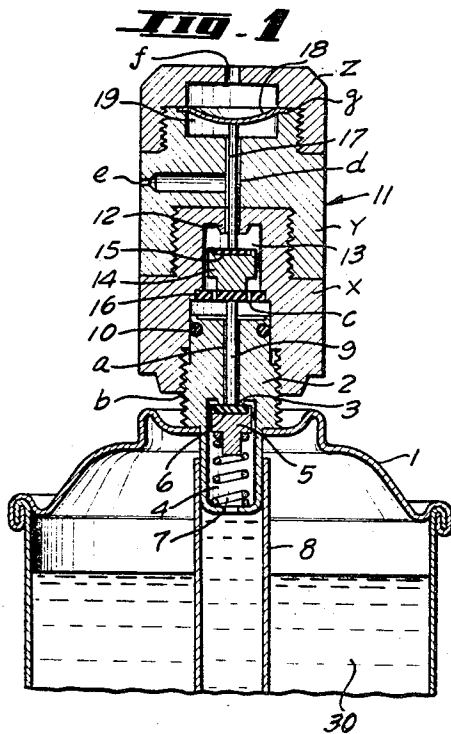


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TAISHO IKETANI
 DEVICE FOR AUTOMATICALLY AND INTERMITTENTLY
 SPRAYING PRESSURIZED PRODUCTS
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1

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DEVICE FOR AUTOMATICALLY AND INTERMITTENTLY SPRAYING PRESSURIZED PRODUCTS

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ABSTRACT OF THE DISCLOSURE

A device for spraying product including liquefied gas from a container, wherein a bimetal member of peculiar shape is placed under the action of absorbing heat of vaporization by the liquefied gas released into the air and the internal pressure of the liquefied gas is utilized so that opening and closing operation of the valve is automatically carried out to perform intermittent spraying operation of the contained substance.

Background of the invention

After chemicals such as insecticide, bactericide, etc. are sprayed within a warehouse, etc., they take effect only during a certain time. When such time has elapsed they begin to be less efficacious. Therefore, it becomes necessary to make repeated intermittent spraying operation by human power or by timer device. However, the human power operation is very troublesome and incurs much expense, and the timer operation requires complicated operation system, making ready use impossible and also incurring much expense.

Summary of the invention

According to the present invention, intermittent spraying operation may be automatically carried out without application of any external force by utilizing a bimetal member formed into such a shape that it moves readily and snappingly between two opposite positions in response to absorption of heat of vaporization and the internal pressure of the liquefied gas and to heating by the external air. For such reason the device according to the present invention may advantageously be utilized anywhere. Such intermittent spraying operation produces full result when applied to chemicals requiring spraying in very small quantities for a long time such as insecticide, bactericide, air purifying agent, fumigating agent, deodorizing agent, etc.

One object of the present invention is to provide a device which sprays automatically and intermittently, without applying any force from outside, pressurized products such as insecticide, bactericide, air purifying agent, fumigating agent, deodorizing agent, etc.

Another object of the present invention is to provide a device in which opening and closing operation of the valve is precisely carried out by snappingly acting bimetal member so as to assure automatic spraying operation.

Still another object of the present invention is to provide a spraying device of aforementioned kind which is of simple structure, easy to make and low in cost.

Brief description of the drawings

The invention is illustrated by way of example in the accompanying drawings which form part of this application and in which:

FIG. 1 is a sectional, elevational view of one embodiment of the present invention in an inoperative state;

FIGS. 2 and 3 are similar views of the same embodiment explaining the operation thereof in a sequential manner; and

2

FIG. 4 is a partial, sectional and elevational view of another embodiment of the present invention.

Description of preferred embodiments

In FIG. 1 there is shown a part of the container 1 having a valve unit 2 secured thereto. The valve unit 2 includes a valve seat 3, a valve 5 and a chamber 4 accommodating the valve 5. The lower end of the valve unit 2 is connected to a pipe 8 for transporting substance 30 to be sprayed out, and the upper portion of the valve unit 2 is provided with a passage *a* for the substance 30 issuing from the valve 5 and with a valve rod 9 for operating the valve. The valve unit 2 is screwed into an outer tubular member 11 through a thread *b*, and is sealed to it by means of a gasket 10. The outer tubular member 11 consists of three portions X, Y and Z, which are threaded together to assure air-tightness. The valve 5 is provided with a gasket 6 to be brought into contact with the valve seat 3 so as to assure air-tightness. The valve 5 is normally urged by a spring 7 against the valve seat 3 so as to prevent leakage of the contained substance. When a valve rod 9 is pushed, the valve 5 is pushed down and form the passage *a* for discharging the contained substance. The outer tubular member 11 is provided with a chamber 13 accommodating a floating valve 14 and having a valve seat 12 cooperating with said floating valve 14. Further, the outer tubular member 11 is provided with a passage *d* for discharging the contained substance that has passed through the valve seat 12 and also with a passage *e* which discharges into the air a part of the contained substance on its way through the passage *d*. Within the passage *d* there is provided a valve rod 17 for operating the floating valve 14.

The passage *d* opens into a chamber 19 in which a bimetal member 18 is arranged. The chamber 19 is so arranged that the bimetal member 18 may freely occupy two positions opposite to each other. Grooves *g* are provided to hold peripheral portion of the bimetal member 18.

A small hole *f* serves to lead outer air into the chamber 19. The floating valve 14 is provided, at a portion to be brought into contact with the valve seat, with a gasket 15 to assure close contact with the valve seat. A plate 16 is secured at the end portion of valve chamber 13 so as to be opposed to the valve rod 9 and is provided with small holes *c* through which the contained substance enters the floating valve chamber 13. A valve rod 17 is provided for operating the floating valve 14. The lower end of the valve rod 17 is connected to the floating valve 14, while the upper end thereof is opposed to the middle portion of the underside of the bimetal member 18. The bimetal member 18 is formed into such a shape that it is snappingly bent when its temperature falls to a certain degree due to absorption of heat of vaporization of the liquefied gas and then it returns snappingly to its original position owing to rise of temperature due to heating by the air. For this purpose a disc-shaped bimetal piece may be so shaped as to protrude at the middle portion thereof, or a bimetal piece of rectangular shape may be suitably bent, thus providing bimetal members of various operating temperature range and of various operating force.

FIG. 2 shows a state where, in cooperation with the thread *b*, the outer tubular member 11 is screwed in so that the valve rod 9 is pushed down by plate 16 and the valve 5 is opened. In this state the contained substance passes through the passage *a*, the small holes *c*, the chamber 13, and the passages *d* and *e*, and is finally discharged into the air. The bimetal member 18 is heated by the air and maintains its position as shown in FIG. 2, holding down the floating valve 14 through the valve rod 17. When a part of the contained substance, that has passed

3

through the passage *d*, enters the chamber 19, the liquefied gas is vaporized and cools the bimetal member 18. When the bimetal member 18 has been cooled to such a degree that its temperature is low enough for its returning movement, the bimetal member 18 moves snappingly to a position as shown in FIG. 3, this movement being caused by the deformation force of the bimetal member 18 itself and also by the pressure of the contained substance acting on the floating valve 14 to push it up. As a result, the floating valve 14 is urged against the valve seat 12, so that the outflow of the contained substance is stopped.

After the stoppage of the outflow of the contained substance, the external air enters through the passages *e* and *f* and gradually heats the bimetal member 18 until its rising temperature reaches the pre-set value, when it moves snappingly to the position as shown in FIG. 2, pushes down the valve rod 17 and repeats the aforementioned operation. Thus, automatic intermittent spraying operation of the contained substance is effectively carried out. This intermittent spraying operation may be stopped by screwing out the outer tubular member 11 to such an extent as to bring it to the position as shown in FIG. 1, thus closing the valve 5 and stopping the outflow of the contained substance.

In the embodiment as shown in FIG. 4, the contained substance passes through a small hole *f'* of the outer tubular member 11 and is discharged into the air over the device. When a disc-shaped bimetal member 18 is utilized with its peripheral portion held by a groove, the bimetal member 18 is provided with a plurality of small holes *h* so that the contained substance passes through the passage *d*, the chamber 19, the small holes *h* and the small hole *f'* and is finally discharged into the air. In such discharge operation the contained substance is vaporized, whereby heat absorption takes place to cool the bimetal member 18, and thus the aforementioned automatic intermittent spraying operation is carried out.

What is claimed is:

1. A device for automatically and intermittently spraying pressurized products comprising a bimetal member

4

which is snappingly deformed at a certain temperature; a passage for the substance to be sprayed; a valve for opening and closing said passage, means for connecting said valve to said bimetal member; and a chamber accommodating said bimetal member, letting in, upon spraying operation, a part of or the whole of the contained substance to be sprayed and placed under the influence of the temperature of the external air.

2. A device for automatically and intermittently spraying pressurized products according to claim 1 wherein the bimetal member is disc-shaped or of similar shape.

3. A device for automatically and intermittently spraying pressurized products according to claim 2 wherein the bimetal member is provided with a plurality of holes for passage of vapor.

4. A device for automatically and intermittently spraying pressurized products according to claim 1 wherein the bimetal member is of polygonal or similar shape.

5. A device for automatically and intermittently spraying pressurized products according to claim 1 wherein a spout for spraying the contained substance is provided at the middle of the passage between the chamber accommodating the bimetal member and the chamber accommodating the floating valve.

6. A device for automatically and intermittently spraying pressurized products according to claim 1 wherein a spout for spraying the contained substance is provided at the chamber accommodating the bimetal member.

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