

(19)



(11)

EP 2 823 893 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
07.12.2016 Bulletin 2016/49

(51) Int Cl.:
B05B 17/06 (2006.01)

(21) Application number: **13197898.3**

(22) Date of filing: **17.12.2013**

(54) **Liquid sprayer**

Flüssigkeitszerstäuber

Pulvérisateur de liquide

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR**

(30) Priority: **08.07.2013 JP 2013142429**

(43) Date of publication of application:
14.01.2015 Bulletin 2015/03

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Description

[0001] The present invention relates to a liquid sprayer.

[0002] As is well known, there are conventionally spray cans using propellants as liquid sprayers for spraying liquid fragrance or the like. This spray can type liquid sprayer is not safe, because it requires use of flammable gas and such gas cannot be said to have a positive influence on a body. Therefore, in recent years, many transducer type liquid sprayers for spraying liquid fragrance or the like by using transducers for generating ultrasonic vibration have been developed.

[0003] As the liquid sprayer using the transducer, there is a sprayer, as disclosed in JP 2010-7899 A, including a liquid storage tank for storing spray liquid, a mist producing means for turning the spray liquid into mist, and a spray liquid supply means for supplying the spray liquid in the liquid storage tank to the mist producing means. The spray liquid supply means includes a first liquid retaining body having one end disposed at a predetermined position in the liquid storage tank to absorb the spray liquid in the liquid storage tank, a substantially cylindrical second liquid retaining body brought into contact with the other end of the first liquid retaining body and having a predetermined inside diameter and a predetermined outside diameter, and a third liquid retaining body having one end brought into contact with an outer peripheral face of the second liquid retaining body at predetermined contact pressure and the other end brought into contact with the mist producing means at predetermined contact pressure.

[0004] In the structure of the sprayer disclosed in JP 2010-7899 A, however, a tip end face of the third liquid retaining body is in a horizontal direction and an entire back face of the transducer forming the mist producing means is in contact with the tip end face. Therefore, the spray liquid turned into the mist by the transducer is dispersed horizontally and it is impossible to widely disperse the spray liquid turned into the mist unless the sprayer is disposed in a high position.

[0005] US2008041972 discloses an atomizer which includes a main body, a liquid container, a liquid delivery member being located above the container for sucking out the liquid, a power part and a spraying device. The spraying device is configured to take required power from the power part and is provided with an actuator to operate a vibratory plate. The vibratory plate is configured slantingly with respect to an end head of the liquid delivery member such that the liquid can be sprayed out in a tilted direction.

[0006] US2004074984 discloses a vibratory plate liquid atomization device having a tilted orifice plate which is vibrated by a piezoelectric actuator.

[0007] JP6320083 discloses an ultrasonic atomizer consisting of a piezoelectric vibrator and a diaphragm, which is always in contact with a liquid absorbing material under a specific load by pressure of a spring.

[0008] Therefore, it is a technical object to achieve a

transducer type liquid sprayer which can widely disperse spray liquid turned into mist even if the liquid sprayer is disposed in a relatively low position. To realize the object, the present inventor has repeatedly carried out test production and experiments through a trial and error process. As a result, the inventor has found a notable fact that the spray liquid turned into the mist can be widely dispersed by a transducer type liquid sprayer including a main body for supporting a spray liquid storage unit and a transducer inside itself, wherein the spray liquid storage unit includes a core for soaking up spray liquid stored in a storage tank to an outside of the storage tank, the transducer is in contact with a front side of a tip end portion of the core protruding from the storage tank of the spray liquid storage unit with a front face of the transducer oriented forward and upward, and a spray hole is formed in a position of the main body facing the front face of the transducer, even if the liquid sprayer is disposed in the relatively low position.

[0009] The above-described technical object can be achieved by the following aspects of the invention.

[0010] According to an aspect of the invention, there is provided a liquid sprayer including a main body for supporting a spray liquid storage unit and a transducer inside itself, wherein the spray liquid storage unit includes a core for soaking up spray liquid stored in a storage tank to an outside of the storage tank, the transducer is in contact with a front side of a tip end portion of the core protruding from the storage tank of the spray liquid storage unit with a front face of the transducer oriented forward and upward, and a spray hole is formed in a position of the main body facing the front face of the transducer.

[0011] According to an aspect of the invention, in the liquid sprayer, a front face of the tip end portion of the core extends in a vertical direction and an inclination angle of the front face of the transducer with respect to the front face of the tip end portion of the core is 10° to 45°.

[0012] According to an aspect of the invention, in either one of the above-described liquid sprayers, the core has a round peripheral face.

[0013] According to an aspect of the invention, in either one of the above-described liquid sprayers, the transducer is in contact with an edge portion of the front side of the tip end portion of the core.

[0014] According to an aspect of the invention, in either one of the above-described liquid sprayers, the transducer is in contact with and pressed against the core.

[0015] According to yet another aspect of the invention, in either one of the above-described liquid sprayers, the transducer forms a transducer unit fixed to a support unit mounted for turning in the main body and the transducer is pressed against the front side of the tip end portion of the core under own weight of the transducer unit.

[0016] Because the invention employs the structure in which the transducer is in contact with the front side of the tip end portion of the core facing the spray hole with the front face of the transducer oriented forward and upward and the spray liquid retained by the core is turned

into the mist by vibration of the transducer, the spray liquid turned into the mist by the transducer spouts forward and upward and can be dispersed widely. Moreover, because the transducer is in contact with the edge portion of the front side of the tip end portion of the core, a contact area of the transducer with the core can be small. As a result, only a small amount of spray liquid left without being turned into the mist is retained between the transducer and the core and evaporation of the spray liquid during stoppage is suppressed, which extends life of the storage tank.

Fig. 1 is a perspective view showing an outward appearance of a liquid sprayer according to First Embodiment;

Fig. 2 is a vertical sectional view of the liquid sprayer shown in Fig. 1;

Fig. 3 is a front view of an inside of a lid member shown in Fig. 1;

Fig. 4 is a sectional view showing a section of the lid member shown in Fig. 3 and taken along line A-A;

Fig. 5 is a front view showing an inside of a support member shown in Fig. 1;

Figs. 6A, 6B, and 6C are explanatory sectional views showing open and closed states of the lid member and the support member of the liquid sprayer shown in Fig. 1;

Fig. 7 is an end view of a core and a transducer shown in Fig. 6A cut in a horizontal direction in a position where they are in contact with each other; and

Figs. 8A and 8B are explanatory views showing a positional relationship between a core and a transducer according to First Variation of Second Embodiment.

[0017] Embodiments of the present invention will be described below.

First Embodiment

[0018] As shown in Fig. 1, a liquid sprayer 1 according to First Embodiment includes a case main body 4 (main body) having a lid member 2 forming a front face side and a support member 3 forming a back face side. In the case main body 4, as shown in Fig. 2, a spray liquid storage unit 5 for storing spray liquid, a transducer unit 6 for turning the spray liquid stored in the spray liquid storage unit 5 into mist, and a power supply unit 7 for supplying electric power to the transducer unit 6 are housed.

[0019] As shown in Figs. 2 to 4, the lid member 2 is formed by left and right side faces 10 and 11 and upper and lower faces 12 and 13 extending backward in rising manners from a front face 9 provided, at a substantially central portion thereof, with a spray hole 8 for discharging the spray liquid which has been turned into the mist and the left and right side faces 10 and 11 and the lower face 13 extend to be longer than the upper face 12. On inner

sides of the left and right side faces 10 and 11, fitting shafts 14 to be connected to the support member 3 protrude to face each other from back upper end portions and support plates 15, 15 for supporting the transducer unit 6 are provided to face each other at positions above the spray hole 8. As shown in Fig. 4, connecting holes 16 are formed in the opposite support plates 15 and each of the connecting holes 16 is formed by a circular hole 17 and a pair of fan-shaped holes 18 extending to be symmetric with respect to a point from the circular hole 17 (see an enlarged view of the connecting hole 16 shown in Fig. 4). A pair of lock holes 19, 19 is formed in the lower face 13.

[0020] As shown in Figs. 2 and 5, the support member 3 is formed by left and right side faces 21 and 22 and an upper face 23 extending forward in rising manners from a back face 20 disposed to be sandwiched between the opposite side faces 10 and 11 of the lid member 2. Fitting holes 24 in which the fitting shafts 14 of the lid member 2 are to be fitted are formed in back upper end portions of the left and right side faces 10 and 11. Therefore, the lid member 2 is connected to the support member 3 to be able to turn by using the fitting shafts 14 fitted in the fitting holes 24 in the support member 3 as rotary shafts. An upper face of the case main body 4 is formed by the upper face 12 of the lid member 2 and the upper face 23 of the support member 3 which are short.

[0021] Inside the back face 20 of the support member 3, a box 25 housing the power supply unit 7 is fixed to an upper portion and a support shelf 26 on which the spray liquid storage unit 5 is disposed is fixed to a lower portion. At a lower end portion in the support member 3, resilient plates 27 having U shapes lying on their sides protrude forward with their only upper tip ends fixed to the back face 20 and lock pins 28 protruding downward from lower tip ends of the resilient plates 27 can move in a vertical direction as the resilient plates 27 bend. In this way, when the lid member 2 is closed onto the support member 3, the lock pins 28 of the support member 3 are fitted in the lock holes 19 in the lid member 2 to lock opening and closing of the lid member 2 with respect to the support member 3. If the support shelf 26 is movable in the vertical direction with respect to the inside of the back face 20 of the support member 3 or can be replaced, the spray liquid storage units 5 of different sizes can be disposed.

[0022] As shown in Figs. 2 and 5, the spray liquid storage unit 5 is formed by a storage tank 29 for storing the spray liquid and a liquid soaking holder 30 for soaking up the spray liquid from the storage tank 29.

[0023] The storage tank 29 has an opening portion 31, into which the liquid soaking holder 30 is inserted, on a front side of its upper face. The opening portion 31 is formed to protrude from the upper face of the storage tank 29 and has an outer peripheral face which is large in diameter on its tip end side and base end side. As a result, a step groove portion 32 is formed between the tip end side and the base end side.

[0024] The liquid soaking holder 30 includes an outer tube portion 33 fitted and fixed into the opening portion 31 in the storage tank 29 and an inner tube portion 34 inserted through a hollow portion in the outer tube portion 33 and extending from an inside to an outside of the storage tank 29 and a circular cylindrical core 35 for soaking up the spray liquid in the storage tank 29 by utilizing capillarity is fixed in a hollow portion of the inner tube portion 34. Remaining portions remaining after forming a clearance between the outer tube portion 33 and the inner tube portion 34 are connected by a connecting bridge 36, which maintains internal pressure and external pressure of the storage tank 29 at the equal pressure. As a result, it is possible to prevent the spray liquid in the storage tank 29 from spouting as the internal pressure increases due to increase in air temperature. A tip end side of the inner tube portion 34 extending outside the storage tank 29 is formed to cover a tip end side of the core 35 protruding from the storage tank 29 and an opening window 38 is formed in the tip end side of the inner tube portion 34 so that only a front side of a tip end portion 37 of the core 35 is exposed. A seal body 39 is fixed to the outer tube portion 33 so as to surround an outer periphery of the outer tube portion 33.

[0025] By fitting a cap (not shown) into the step groove portion 32 formed at the opening portion 31 of the storage tank 29, it is possible to prevent evaporation of the spray liquid from the storage tank 29.

[0026] The core 35 is formed in the circular cylindrical shape. As material of the core 35, felt, nonwoven fabric made of natural pulp, and material obtained by twining fibers such as polypropylene and polyethylene may be used.

[0027] As shown in Figs. 2 to 5, the power supply unit 7 is formed by a battery, a control board, and the like and housed in the box 25. A lower face of the box 25 is provided with a back holding plate 41 supported by a pair of hanging pieces 40, 40 extending downward and support pieces 42 extending downward from between the paired hanging pieces 40, 40 and from the box 25. The back holding plate 41 is formed in a U shape which is open forward and is formed in such a shape as to be fitted in the step groove portion 32 of the storage tank 29 disposed on the support shelf 26. In a state in which the step groove portion 32 of the storage tank 29 is fitted in the back holding plate 41 of the box 25, a back side of the inner tube portion 34 protruding from the opening portion 31 of the storage tank 29 is supported by the support pieces 42. Inside the lid member 2, a front holding plate 43 positioned to face the back holding plate 41 protrudes.

[0028] Power-supply voltage of the power supply unit 7 may be set to be high enough to adapt to size of a space where the spray liquid is sprayed by the liquid sprayer 1. For example, DC 4.5 V, 6.0 V, and 7.5 V may be used. It is also possible that magnitude of the voltage can be changed. As power for the power supply unit 7, AC supplied from a battery or a wall outlet may be con-

verted into DC by a converter and used and both the battery and the converter may be mounted so as to switch between the power from the battery and the power from the wall outlet.

[0029] As shown in Figs. 2 and 3, the transducer unit 6 includes a support arm 44 having a recessed shape and a transducer 46 in a thin plate shape and fixed to protrude from a center of a lateral bar portion 45 of the support arm 44, and the lateral bar portion 45 is provided with paired protecting pieces 47, 47 positioned parallel on opposite sides of the transducer 46. At tip ends of the vertical bar portions 48, 48 of the support arm 44, connecting shafts 49 protruding outward are provided. Each of the connecting shafts 49 includes a round shaft 50 and restricting shafts 51 extending to be symmetric with respect to a point from the round shaft 50 (see the enlarged view of the connecting shaft 49 shown in Fig. 4). By fitting the opposite connecting shafts 49 into the connecting holes 16 in the support plates 15 provided to the inner side of the lid member 2, the support arm 44 is supported to be able to turn between the opposite support plates 15 of the lid member 2. Turning of the support arm 44 is restricted by interference between the restricting shafts 51 of the connecting shafts 49 and the fan-shaped holes 18 of the connecting holes 16. When the support arm 44 is supported between the opposite support plates 15, 15 of the lid member 2, the lateral bar portion 45 provided astride tip ends of the opposite vertical bar portions 48, 48 is inclined to extend from the tip ends of the vertical bar portions 48, 48 toward the lid member 2.

[0030] Next, a method of assembling the liquid sprayer 1 according to the embodiment will be described.

[0031] First, the power supply unit 7 is housed into the box 25 in the support member 3. The connecting shafts 49 of the support arm 44 are fitted into the connecting holes 16 formed in the opposite support plates 15 of the lid member 2 to support the support arm 44 between the opposite side faces 10 and 11 of the lid member 2. Next, the opposite fitting shafts 14 of the lid member 2 are inserted into the opposite fitting holes 24 in the support member 3 to connect the lid member 2 to the support member 3 so that the lid member 2 can turn. After that, an electric wire (not shown) extending from the power supply unit 7 is connected to the transducer 46 of the transducer unit 6. Then, the spray liquid storage unit 5 formed by inserting the liquid soaking holder 30 into the opening portion 31 of the storage tank 29 is disposed on the support shelf 26 of the support member 3 and the step groove portion 32 of the spray liquid storage unit 5 is fitted into the back holding plate 41. Lastly, the lid member 2 is closed onto the support member 3 and the lock pins 28 of the support member 3 are fitted into the lock holes 19 in the lid member 2 to thereby lock opening and closing of the lid member 2 with respect to the support member 3. At this time, the front holding plate 43 of the lid member 2 is fitted into the step groove portion 32 of the spray liquid storage unit 5 and the spray liquid storage unit 5 is fixed while sandwiched between the front and

back holding plates 43 and 41.

[0032] The transducer 46 and the tip end portion 37 of the core 35 with which the transducer 46 is in contact are exposed through the spray hole 8 in the lid member 2. If the electric power is supplied from the power supply unit 7 to vibrate the transducer 46, the spray liquid retained by the core 35 is turned into the mist by the vibration of the transducer 46 and dispersed forward and upward outside the case main body 4 through the spray hole 8. Because the tip end portion 37 of the core 35 in contact with the transducer 46 except the front side of the tip end portion 37 exposed through the opening window 38 is covered with the liquid soaking holder 30, it is possible to prevent the misty spray liquid, which has been turned into the mist by the transducer 46, from being sprayed inside the case main body 4 and the spray liquid from wastefully evaporating from the core 35.

[0033] To replace the spray liquid storage unit 5, by inserting a pin (not shown) into the lock holes 19 in the lid member 2 to push the lock pins 28 inward, the locking of the lid member 2 to the support member 3 is released and the lid member 2 is turned forward with respect to the support member 3. Next, the old spray liquid storage unit 5 is detached from the support shelf 26 and a new spray liquid storage unit 5 is mounted to the back holding plate 41. Lastly, the lid member 2 is closed onto the support member 3 and locked.

[0034] Next, a positional relationship between the support arm 44 and the core 35 when the lid member 2 is opened and closed with respect to the support member 3 of the liquid sprayer 1 according to the embodiment will be described based on Figs. 6A to 7. In Figs. 6A to 6C, a lower portion of the case main body 4, the box 25, and the power supply unit 7 are not shown and an enlarged view showing a relationship between the connecting shaft 51 of the support arm 44 and the connecting hole 16 of the support plate 15 is shown.

[0035] First, if the lid member 2 is completely closed onto the support member 3, the spray liquid storage unit 5 is fixed in the case main body 4 while sandwiched between the front and back holding plates 43 and 41. As shown in Fig. 6A, a back face of the transducer 46 comes into contact with an edge portion 52 of a front side of the tip end portion 37 of the core 35 exposed from the opening window 38 of the liquid soaking holder 30 and a front face of the transducer 46 faces the spray hole 8 while oriented forward and upward. In this state, the restricting shafts 51 of the connecting shafts 49 are not interfering with the fan-shaped holes 18 of the connecting holes 16 and therefore turning of the support arm 44 in a front-back direction is not restricted. Furthermore, because the lateral bar portion 45 is positioned on the front side of the axis of turning of the support arm 44, a force for turning backward is always acting on the support arm 44. Therefore, the transducer 46 is in contact with and pressed against the edge portion 52 of the front side of the tip end portion 37 of the core 35 under own weight of the transducer unit 6.

[0036] Next, if the lid member 2 is completely opened from the support member 3, as shown in Fig. 6B, the back face of the transducer 46 is separated from the edge portion 52 of the front side of the tip end portion 37 of the core 35. At this time, the restricting shafts 51 of the connecting shafts 49 are interfering with the fan-shaped holes 18 of the connecting holes 16. As a result, the backward turning of the support arm 44 is restricted and the support arm 44 is lifted together with the lid member 2.

[0037] Then, if the lid member 2 is closed to some extent toward the support member 3, as shown in Fig. 6C, a lower end of the back face of the transducer 46 fixed to the support arm 44 comes into contact with the edge portion 52 of the front side of the tip end portion 37 of the core 35.

[0038] If the lid member 2 is completely closed onto the support member 3, they come into the state shown in Fig. 6A.

[0039] An inclination angle θ between the front face of the transducer 46 and the flat front face of the core 35 oriented toward the spray hole 8 when the back face of the transducer 46 is in contact with the tip end portion 37 of the core 35 exposed from the opening window 38 is preferably 10° to 45° and more preferably 10° to 30° . If the inclination angle is larger than 45° , a horizontal dispersion distance of the spray liquid turned in to the mist is short and it is impossible to widely disperse the spray liquid. If the inclination angle is smaller than 10° , an upward dispersion distance of the spray liquid turned into the mist is insufficient and it is impossible to widely disperse the spray liquid. Moreover, a large amount of spray liquid accumulates in a clearance formed between the transducer and the core 35 and an evaporation amount of the spray liquid during stoppage increases to thereby shorten life of the storage tank.

[0040] The spray hole 8 of the lid member 2 is formed to open in a portion of the lid member 2 facing a front face of the transducer 46 in a position in contact with the core 35 and a tubular passage extending from the spray hole 8 is formed in front of the transducer 46. In this way, the spray liquid turned into the mist by the transducer 46 is properly dispersed to the outside of the case main body 4.

[0041] The core 35 according to the embodiment has a peripheral face formed into a round shape and the transducer is pressed under own weight of the transducer unit due to turning of the support arm to come in contact with the front side of the tip end portion of the core. Therefore, it is possible to easily and properly bring the back face of the transducer 46 and the tip end portion of the core 35 into contact with each other.

Second Embodiment

[0042] The present embodiment is a variation of the core in First Embodiment described above and the same reference numerals as those in Figs. 1 to 6C designate the same or corresponding portions in Figs. 8A and 8B.

Figs. 8A and 8B show a positional relationship between a core and a transducer when a support member is closed with respect to a lid member, wherein Fig. 8A is a vertical sectional view and Fig. 8B is an end view of the core and the transducer shown in Fig. 8A cut in a horizontal direction in a position where they are in contact with each other.

[0043] The core 35 in the embodiment is formed in a shape of a square prism as shown in Fig. 8B. Any one of faces of the core 35 extending in the vertical direction is positioned to face a spray hole 8. When the lid member 2 is closed onto the support member 3, a back face of the transducer 46 comes in contact with an edge portion 52 formed by a front face and an upper face positioned on a front side of a tip end portion 37 of the core 35 exposed from an opening window 38.

[0044] In the embodiment, a contact face between the transducer and the core is larger and efficiency of turning spray liquid into mist is increased as compared with First Embodiment described above and employing the circular cylindrical core.

[0045] The shape of the core in the invention is not limited to those shown in the above-described respective embodiments. It is essential only that the shape of the core has the edge portion for coming in contact with the back face of the transducer on the front side of the tip end portion and facing the spray hole. The shape other than the front side of the tip end portion is not especially limited, if the core can soak up the spray liquid.

[0046] The spray liquid in the invention may be fragrance, deodorant, germicide, or the like but is not limited to them. The spray liquid may be other agents which can be turned into mist by the ultrasonic vibration of the transducer.

[0047] Although the center of gravity of the support arm is positioned on the back side of the axis of turning so that the force for turning backward acts on the support arm when the transducer fixed to the support arm is brought into contact with and pressed against the core in the method employed in First Embodiment described above, the method is not limited to it. For example, resilient bodies such as springs may be disposed at connecting portions between the support arm and the support plates to thereby always press the support arm backward.

DESCRIPTION OF REFERENCE SIGNS

[0048]

- 1 Liquid sprayer
- 2 Lid member
- 3 Support member
- 4 Case main body
- 5 Spray liquid storage unit
- 6 Transducer unit
- 7 Power supply unit
- 8 Spray hole

- 9 Front face
- 10 Left side face
- 11 Right side face
- 12 Upper face
- 5 13 Lower face
- 14 Fitting shaft
- 15 Support plate
- 16 Connecting hole
- 17 Circular hole
- 10 18 Fan-shaped hole
- 19 Lock hole
- 20 Back face
- 21 Left side face
- 22 Right side face
- 15 23 Upper face
- 24 Fitting hole
- 25 Box
- 26 Support shelf
- 27 Resilient plate
- 20 28 Lock pin
- 29 Storage tank
- 30 Liquid soaking holder
- 32 Step groove portion
- 31 Opening portion
- 25 33 Outer tube portion
- 34 Inner tube portion
- 35 Core
- 36 Connecting bridge
- 37 Tip end portion
- 30 38 Opening window
- 39 Seal body
- 40 Hanging piece
- 41 Back holding plate
- 42 Support piece
- 35 43 Front holding plate
- 44 Support arm
- 45 Lateral bar portion
- 46 Transducer
- 47 Protecting piece
- 40 48 Vertical bar portion
- 49 Connecting shaft
- 50 Round shaft
- 51 Restricting shaft
- 52 Edge portion

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Claims

- 1. A liquid sprayer (1) comprising a main body for supporting a spray liquid storage unit (5) and a transducer (46) inside itself, wherein the spray liquid storage unit includes a core (35) for soaking up spray liquid stored in a storage tank (29) to an outside of the storage tank, the transducer is in contact with a front side of a tip end portion (37) of the core protruding from the storage tank of the spray liquid storage unit with a front face of the transducer oriented forward and upward, and a spray hole (8) is formed

in a position of the main body facing the front face of the transducer, **characterized in that** the liquid sprayer further comprises an inner tube portion (34) extending outside the storage tank and an opening window (38) is formed in the tip end side of the inner tube portion such that only a front side of a tip end portion (37) of the core (35) is exposed.

2. The liquid sprayer according to claim 1, wherein a front face of the tip end portion of the core extends in a vertical direction and an inclination angle of the front face of the transducer with respect to the front face of the tip end portion of the core is 10° to 45°.
3. The liquid sprayer according to claim 1 or 2, wherein the core has a round peripheral face.
4. The liquid sprayer according to any one of claims 1 to 3, wherein the transducer is in contact with an edge portion of the front side of the tip end portion of the core.
5. The liquid sprayer according to any one of claims 1 to 4, wherein the transducer is in contact with and pressed against the core.
6. The liquid sprayer according to any one of the preceding claims, wherein the transducer is included in a transducer unit (6), said transducer unit including a support arm (44) having a recessed shape and a transducer (46) in a thin plate shape and fixed to protrude from a center of a lateral bar portion (45) of the support arm (44), and the lateral bar portion (45) is provided with paired protecting pieces (47) positioned parallel on opposite sides of the transducer 46.

Patentansprüche

1. Flüssigkeitszerstäuber (1), aufweisend einen Hauptkörper zum Abstützen einer Sprühflüssigkeitsspeichereinheit (5) und einen Wandler (46) darin, wobei die Sprühflüssigkeitsspeichereinheit einen Kern (35) zum Aufnehmen von in einem Vorratstank (29) gespeicherter Sprühflüssigkeit zum Aufsaugen an eine Außenseite des Vorratstanks aufweist, wobei der Wandler in Kontakt mit einer Vorderseite eines am Vorratstank der Sprühflüssigkeitsspeichereinheit vorstehenden Spitzenendenabschnitts (37) des Kerns ist, wobei eine Stirnseite des Wandlers vorwärts und aufwärts gerichtet ist und ein Sprühloch (8) in einer zur Stirnfläche des Wandlers gerichteten Position des Hauptkörpers gebildet wird, **dadurch gekennzeichnet, dass** der Flüssigkeitszerstäuber ferner einen inneren Rohrabschnitt (34) aufweist, der sich außerhalb des Vorratstanks erstreckt, und ein Öffnungsfenster (38) in der Spitzenendenseite

des inneren Rohrabschnitts derart gebildet wird, dass nur eine Vorderseite eines Spitzenendenabschnitts (37) des Kerns (35) exponiert ist.

2. Flüssigkeitszerstäuber nach Anspruch 1, wobei sich eine Stirnfläche des Spitzenendenabschnitts des Kerns in einer senkrechten Richtung erstreckt und ein Neigungswinkel der Stirnseite des Wandlers in Bezug auf die Stirnseite des Spitzenendenabschnitts des Kerns 10° bis 45° beträgt.
3. Flüssigkeitszerstäuber nach Anspruch 1 oder 2, wobei der Kern eine runde, umlaufende Fläche aufweist.
4. Flüssigkeitszerstäuber nach einem der Ansprüche 1 bis 3, wobei der Wandler in Kontakt mit einem Randabschnitt der Vorderseite des Spitzenendenabschnitts des Kerns ist.
5. Flüssigkeitszerstäuber nach einem der Ansprüche 1 bis 4, wobei der Wandler mit dem Kern in Kontakt ist und gegen diesen gepresst wird.
6. Flüssigkeitszerstäuber nach einem der vorhergehenden Ansprüche, wobei der Wandler in einer Wandlereinheit (6) enthalten ist, wobei die Wandlereinheit einen eine vertiefte Form aufweisenden Stützarm (44) und einen Wandler (46) in einer dünnen Plattenform umfasst und so befestigt ist, dass sie von einer Mitte eines seitlichen Stababschnitts (45) des Stützarms (44) vorsteht, und der seitliche Stababschnitt (45) mit gepaarten Schutzteilen (47) versehen ist, die parallel auf gegenüber liegenden Seiten des Wandlers (46) bereitgestellt sind.

Revendications

1. Pulvérisateur de liquide (1) comprenant un corps principal pour supporter une unité de stockage de liquide de pulvérisation (5) et un transducteur (46) à l'intérieur de ce dernier, dans lequel l'unité de stockage de liquide de pulvérisation comprend une âme (35) pour absorber le liquide de pulvérisation stocké dans un réservoir de stockage (29) jusqu'à un extérieur du réservoir de stockage, le transducteur est en contact avec un côté avant d'une partie d'extrémité de pointe (37) de l'âme faisant saillie du réservoir de stockage de l'unité de stockage de liquide de pulvérisation avec une face avant du transducteur orientée vers l'avant et vers le haut, et un trou de pulvérisation (8) est formé dans une position du corps principal faisant face à la face avant du transducteur, **caractérisé en ce que** le pulvérisateur de liquide comprend en outre une partie de tube interne (34) s'étendant vers l'extérieur du réservoir de stockage et une fenêtre d'ouverture (38) est formée dans

le côté d'extrémité de pointe de la partie de tube interne de sorte que seul un côté avant d'une partie d'extrémité de pointe (37) de l'âme (35) est exposé.

2. Pulvérisateur de liquide selon la revendication 1, dans lequel une face avant de la partie d'extrémité de pointe de l'âme s'étend dans une direction verticale et un angle d'inclinaison de la face avant du transducteur par rapport à la face avant de la partie d'extrémité de pointe de l'âme est de 10° à 45°. 5
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3. Pulvérisateur de liquide selon la revendication 1 ou 2, dans lequel l'âme a une surface périphérique arrondie. 15
4. Pulvérisateur de liquide selon l'une quelconque des revendications 1 à 3, dans lequel le transducteur est en contact avec une partie de bord du côté avant de la partie d'extrémité de pointe de l'âme. 20
5. Pulvérisateur de liquide selon l'une quelconque des revendications 1 à 4, dans lequel le transducteur est en contact avec et comprimé contre l'âme. 25
6. Pulvérisateur de liquide selon l'une quelconque des revendications précédentes, dans lequel le transducteur est inclus dans une unité de transducteur (6), ladite unité de transducteur comprenant un bras de support (44) ayant une forme évidée et un transducteur (46) dans une forme de plaque fine et fixé pour faire saillie d'un centre d'une partie de barre latérale (45) du bras de support (44) et la partie de barre latérale (45) est prévue avec une paire de pièces de protection (47) positionnées parallèlement aux côtés opposés du transducteur (46). 30
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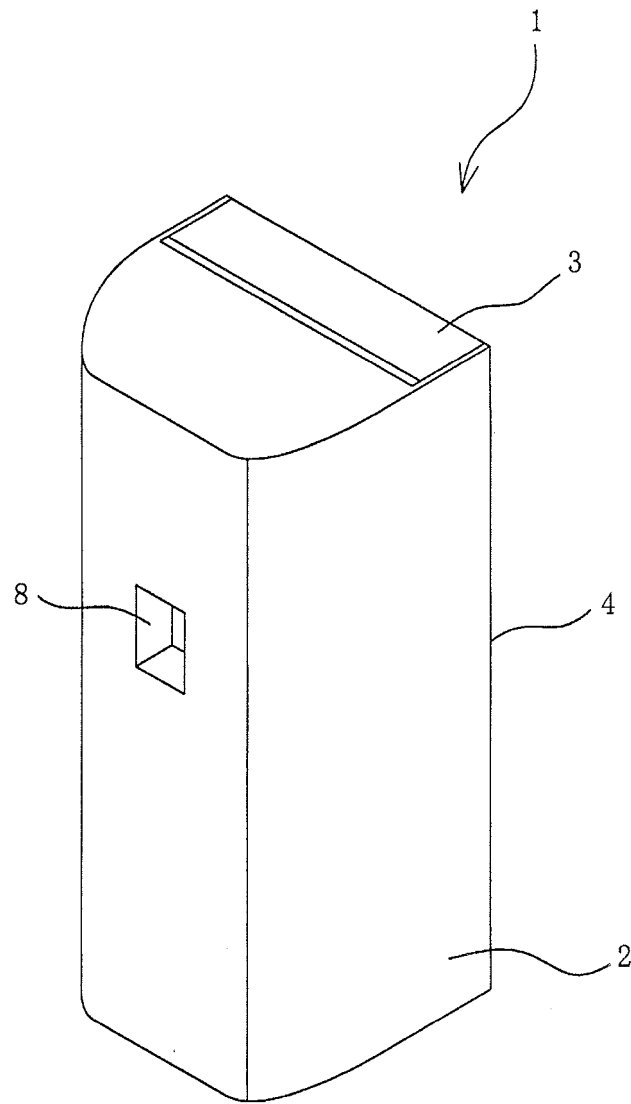


FIG. 1

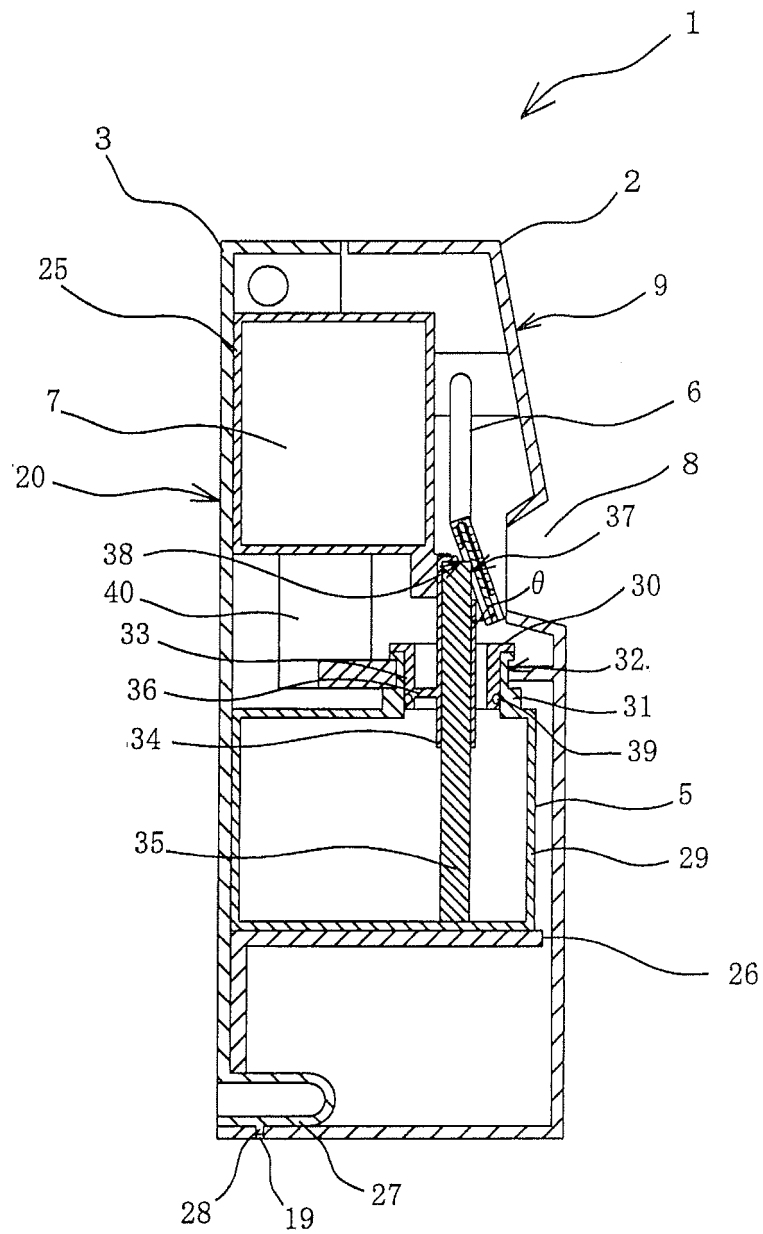


FIG. 2

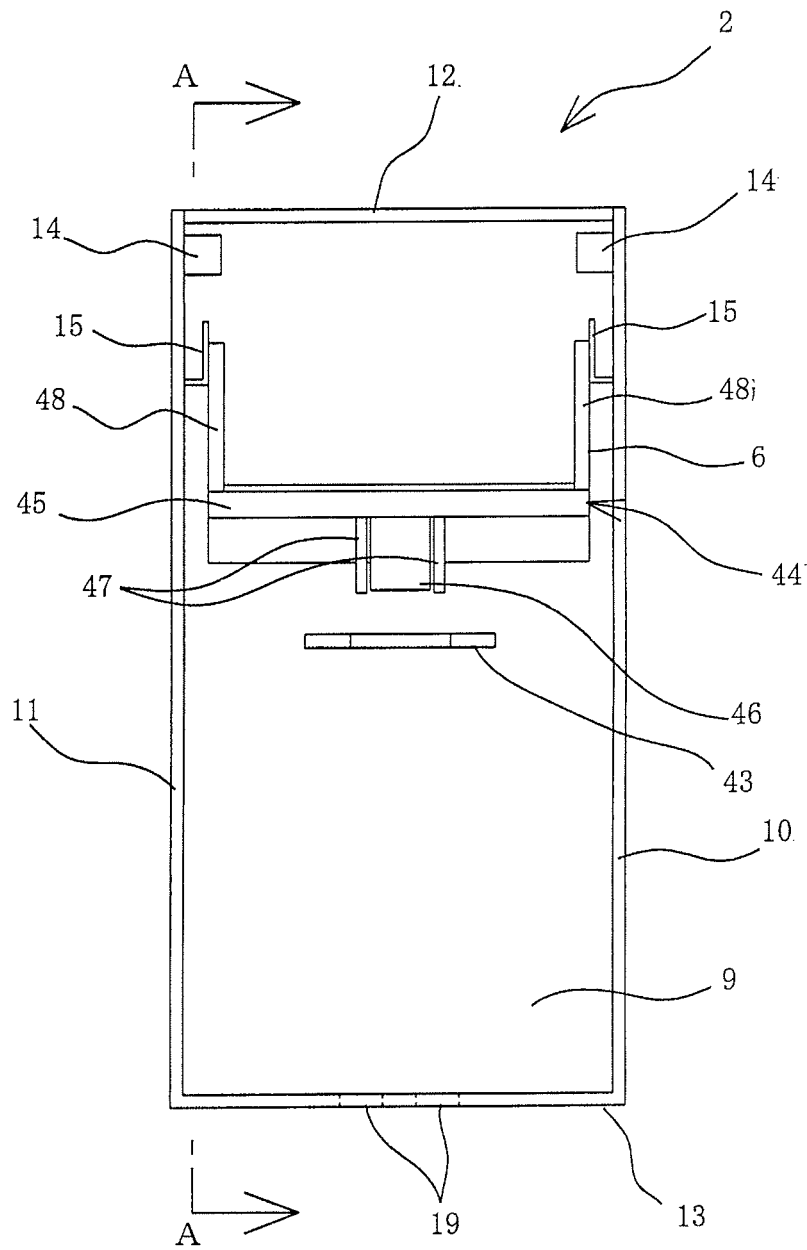


FIG. 3

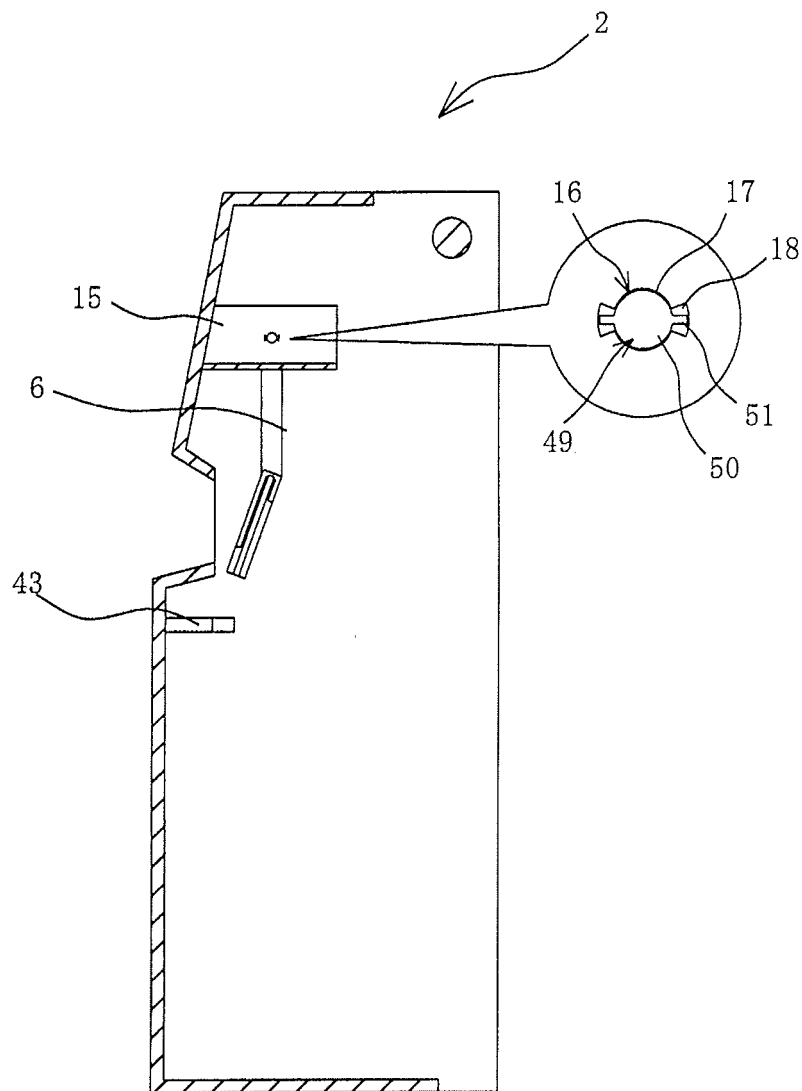


FIG. 4

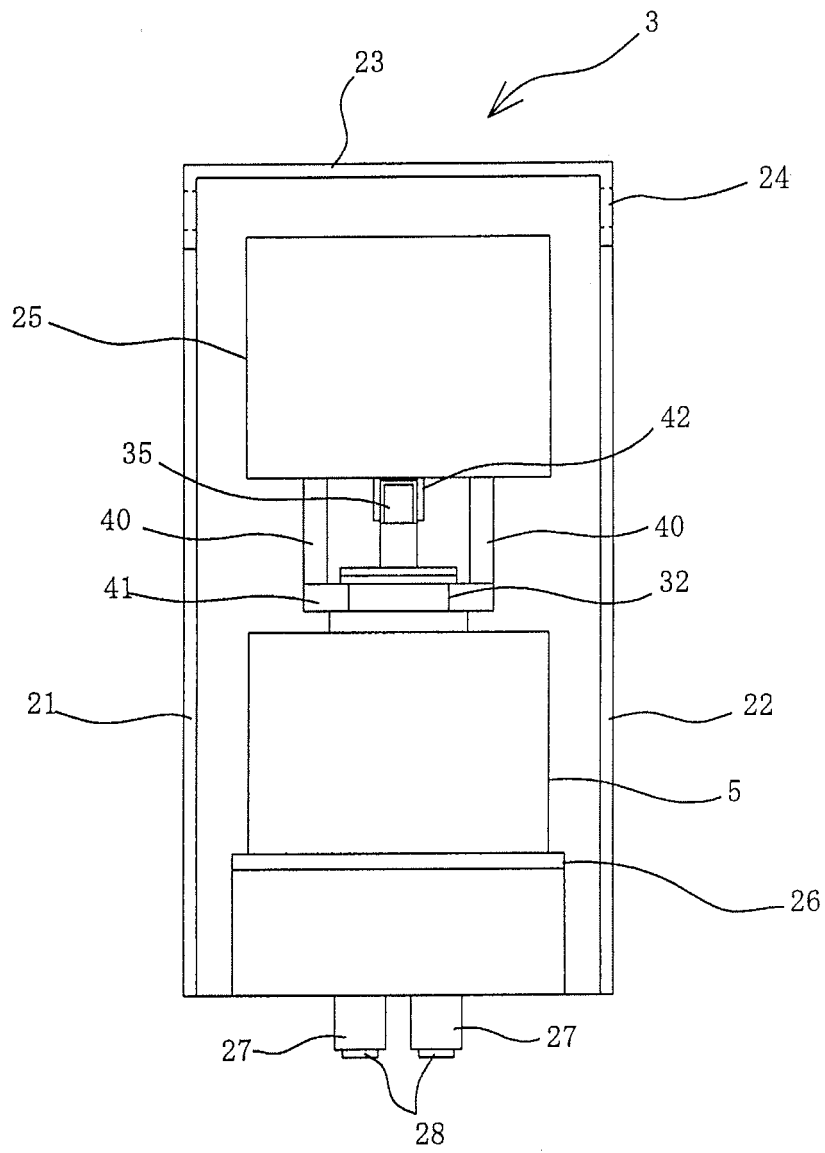


FIG. 5

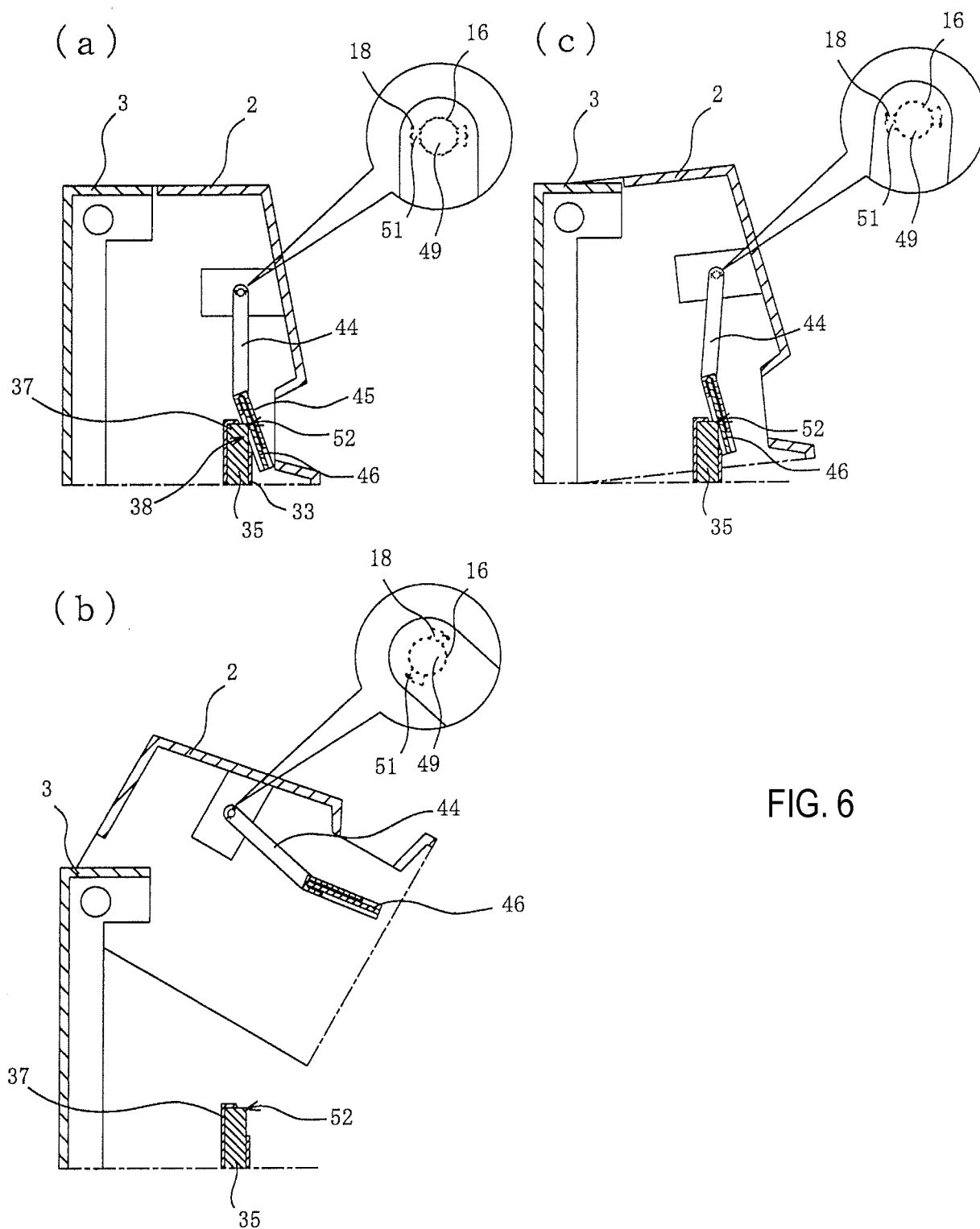


FIG. 6

FIG. 7

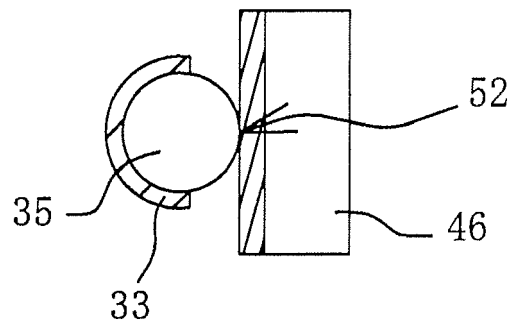
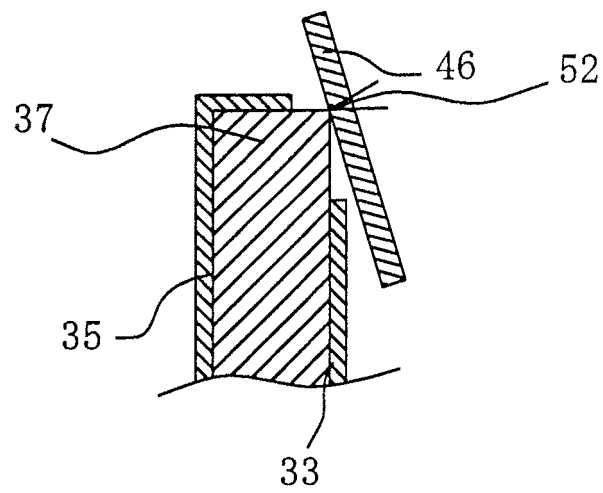
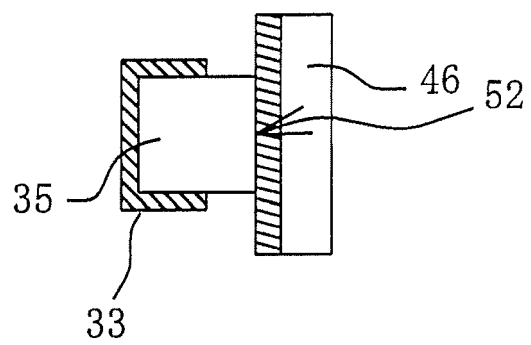


FIG. 8

(a)



(b)



REFERENCES CITED IN THE DESCRIPTION

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