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(71) Applicant:
PENTEL KABUSHIKI KAISHA
Chuo-ku, Tokyo 103 (JP)

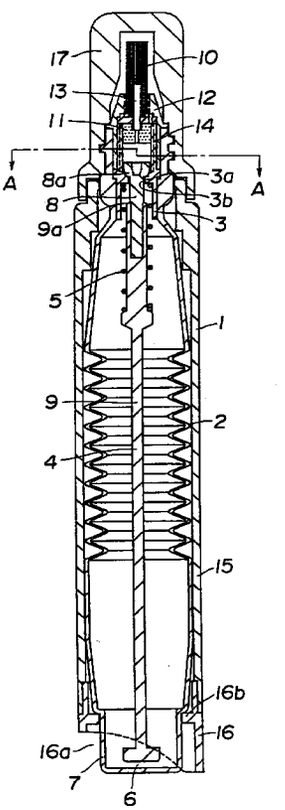
(72) Inventor: **USAMI, Hideyuki**
Saitama 340 (JP)

(74) Representative: **Kyle, Diana et al**
Elkington and Fife
Prospect House
8 Pembroke Road
Sevenoaks, Kent TN13 1XR (GB)

(54) FLUID DISPENSER

(57) A fluid dispenser comprising a variable-volume container (1) storing a liquid, and a valve rod (4) having in an opening at a tip end of the container (1) a valve seat portion (3a) and a first valve portion (8a) adapted to resiliently abut against the valve seat portion (3a), said valve rod (4) extending rearward in the container (1) so as to push a rear end of the container (1) to thereby advance the valve rod (4) and deform the container, thereby opening a valve to permit the liquid to be discharged. A second valve portion (9a) for closing the valve upon advancement of the valve rod (4) is provided intermediate the valve rod.

FIG. 1



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Description

TECHNICAL FIELD

The present invention relates to a liquid discharge port at the distal end thereof or having a coating member at the discharge port. As the kinds of liquids, there are considered writing liquids such as China ink, a paint, ink and etc., toilet lotions such as eye liners, lip colors, manicures and etc., liquid seasonings, machine oils and cleaning liquids.

BACKGROUND OF THE INVENTION

As one of liquid discharge instruments, there is the one that is disclosed in the Unexamined Japanese Patent Publication No. H2-112379 file in the name of the present applicant. This instrument has the structure such that a liquid is received in a capable of reducing and recovering its volume and a valve comprising a valve seat and a valve rod capable of repulsively contacting the valve seat is disposed at the opening of the container so as to serve as a plug for the opening and the valve rod is caused to extend through the container up to the rear portion thereof whereby when a pressure is applied to the rear end of the container, the container deforms and the valve rod is moved forward to open the valve thereby allowing the liquid to be discharged outside the container. Further, the rear portion of the container is supported by an outer sheath having a contact wall for limiting the degree of recovery of the volume of the container and when the container is supported by the contact wall of the outer sheath, a small clearance is provided between the rear end of the valve rod and the inner wall of the rear end of the container.

Although the above-described conventional technology has had the advantages that any undesired leakage of liquid hardly takes place yet it is possible to expect a stabilized discharge of liquid, there has still remained a room for its further improvement.

That is, there has been a problem arising not from the ordinary pressing operation on the container but from the continuation of a pressing operation on a knock body of the container. When the knock body is kept pressed, the valve is also kept opened and as a result, the liquid excessively flows into a coating member at the top of the container and finally, the liquid begins to drip. Although, in this case, a porous member is provided behind the coating member to prevent the dripping of such excessive flow of the liquid (e.g., ink), there is a limitation to the amount of the liquid to be received by the container.

Accordingly, an object of the present invention is to provide a liquid discharge instrument which can prevent the dripping of a liquid therefrom even when the instrument is kept pressed.

Another object of the present invention is to provide an inexpensive liquid discharge instrument capable of meeting the recent consumers' demand for inexpensive products in various fields of industry.

DISCLOSURE OF THE INVENTION

According to one aspect of the present invention, there is provided a liquid discharge instrument having the structure such that a liquid is received within a container capable of reducing and recovering its volume and having an opening at the distal end thereof, a valve comprising a valve seat and a valve rod with a first valve portion capable of repulsively contacting the valve seat is disposed within the opening of the container with the valve rod extending up to a rear portion of the interior of the container whereby when the rear end of the container is pressed, the valve rod is moved forward and the container deforms to open the valve thereby allowing the liquid to be discharged outside the container. Further, this liquid discharge instrument is characterized by the additional provision of a second valve portion at the intermediate portion of the valve rod so that when the valve rod is moved forward, the valve is closed by this second valve portion.

According to a second aspect of the present invention, there is provided a liquid discharge instrument having the structure such that a liquid is received within a container capable of reducing and recovering its volume, a coating body is provided at the distal end of the container and a bellows portion capable of contraction and expansion in the longitudinal direction of the container is formed integral with the container with the thickness of the bellows portion being made smaller than that of the remaining portion of the container.

According to a third aspect of the present invention, there is provided a liquid discharge instrument having the structure such that a drawing head in the form of a bundle of fibers is attached to the distal end of the above-mentioned container through a fixing tube which is vertically split into two halves in such a manner that these two halves are connected to the base portion of the fixing tube on one side while they are made flexible on the other side and further, a tubular portion to be inserted into the drawing head is formed integral with the base portion of the fixing tube.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a vertical sectional view of a fluid discharge instrument according to one embodiment of the present invention;

Fig. 2 is a sectional view taken along the A - A line of Fig. 1;

Fig. 3 is an enlarged sectional view of an essential portion of the fluid discharge instrument shown in Fig. 1;

Fig. 4 is an enlarged sectional view of an essential portion of the fluid discharge tool of Fig. 1, especially when the fluid discharge tool is in operation;

Fig. 5 is a vertical sectional view of a fluid discharge instrument according to a second embodiment of the present invention;

Fig. 6 is an external view of the fluid discharge instrument shown in Fig. 5;

Fig. 7 is a vertical sectional view of a fluid discharge instrument according to a third embodiment of the present invention;

Fig. 8 is an enlarged view of a "B" portion shown in Fig. 7;

Fig. 9 is an enlarged view of a modification of the "B" portion show in Fig. 8;

Fig. 10 is a sectional view taken along the C - C line of Fig. 7;

Fig. 11 is a front view of a drawing head (or writing nib) fixing tube to which a drawing head (writing nib) is fixed;

Fig. 12 is an exploded perspective view of the drawing head fixing tube shown in Fig. 11;

Fig. 13 is an enlarged view of a cap of the liquid discharge instrument shown in Fig. 7;

Fig. 14 is a vertical sectional view of an essential portion of the liquid discharge instrument especially when a head cap is fitted thereon;

Fig. 15 is an enlarged view of a "D" portion of the cap shown in Fig. 13;

Fig. 16 is a vertical sectional view of a liquid discharge instrument according to a fourth embodiment of the present invention; and

Fig. 17 is a vertical sectional view of an essential portion of a liquid discharge instrument according to a fifth embodiment of the present invention.

BEST MODES FOR CARRYING OUT THE INVENTION

Fig. 1 shows a first embodiment of the present invention which is a nail coloring instrument comprising a container 1 having a manicuring tool received therein. The container 1 includes a self-elastic bellows portion 2 at the center thereof. The self-elastic portion 2 is made of polyethylene, polypropylene, nylon, ethylene-vinyl alcohol, etc. by a blow molding and the like. Further, the container 1 has an opening at the distal end thereof and a valve seat member 3 is press-fitted into the opening. The valve seat member 3 may be made integral with the container 1. A valve rod 4 is constantly urged backward by a repulsive spring means 5 such as a coil spring stretched between it and the rear end of 00the valve seat member 3. The repulsive spring means 5 may be disposed ahead of the valve rod 4 or may be formed integral with the valve rod 4 or the valve seat member 3. The valve rod 4 extends through the interior of the container 1 so that a small clearance 6 is formed between the rear end thereof and the inner wall of the rear end of the container 1. Further, the rear end of the container 1 forms itself a knock body 7.

The valve seat member 3 has at substantially the intermediate portion thereof a small-diameter portion 3a which forms itself and serves as a valve seat portion designated at the same reference numeral 3a.

Further, the valve rod 4 comprises a first valve rod 8 and a second valve rod 9 such that the distal end of the first valve rod 8 forms a first valve portion 8a which abuts against a first end face of the valve seat portion 3a and closes a valve hole 3b. At the same time, the distal end of a second valve rod 9 forms a second valve portion 9a which abuts against a rear end face of the valve seat portion 3a and closes the valve hole 3b. In this embodiment, the second valve portion 9a is formed by making the diameter of the second valve rod 9 larger than that of the first valve rod 8 but both the first valve rod 8 and the second valve rod 9 are formed integral with each other and the first valve portion and the second valve portion may be formed as large-diameter portions, respectively.

At the distal end of the container 1 there is projecting a drawing head (or writing nib) 10 formed of a bundle of fibers and a drawing head fixing tube 12 having a porous member 11 serving as a temporary liquid reservoir (trap) for the drawing head 10 is attached to the distal end by suitable means such as press-fitting, screw-fitting, bonding or the like. Further, the drawing head 10 and the porous member 11 are in communication with each other through a cylindrical body 13 thereby facilitating the circulation of a liquid through the drawing head 10 at the time of starting the use of the instrument.

Reference numeral 14 designates an air exchanging slit so formed in the valve seat member 3 that air selectively passes through comparatively large gaps having weak capillary attractions and enters into the container 1.

Reference numeral 15 designates an outer sheath so formed as to cover the container 1 in its entireties. Further, to the rear end of the outer sheath 15 there is attached, by press-fitting, a stopper ring 16 which leaves about one half of the knock body 7 of the container 1 exposed. The exposure of the knock body 7 is made possible by forming a recess 16a on the stopper ring 16. The reason why the degree of exposure of the knock body 7 is made to be about half the length of the knock body is that the knock body is prevented from being unnecessarily pressed due to an unexpected external force.

Further, the stopper ring 16 also prevents the slipping off of the container 1 from the outer sheath 15 by the formation of a projection on the inner peripheral surface thereof.

Reference numeral 17 designates a cap which is removably screw-fitted on the distal end of the container 1 or it may be attached to the latter by convex-concave fitting or it may be merely press-fitted to the latter.

Next, the method of using the fluid discharge instrument and the operation thereof will be described. When the knock body 7 of the container 1 in the state shown in Figs. 1 and 3 is pressed, the bellows portion 2 contracts

and at the same time, the interior of the container 1 is pressurized so that the inner surface of the knock body 7 eventually comes into contact with the top end of the valve rod 3. In this case, when the knock body 7 is kept pressed further, the first valve member 8a leaves away from the front end face of the valve seat portion 3a to provide the valve hole 3b. Then, the pressurized liquid in the container 1 is forced to flow into the porous member 11 and the drawing head 10.

In the above state, if the knock body 7 is further pressed, the second valve portion 9a comes into contact with the rear end face of the valve seat portion 3a to thereby close the valve hole 3b (see Fig. 4). Thus, the flow and supply of the liquid in the container 1 toward the porous member 11 are interrupted.

In the instant embodiment, by pressing the container 1, the valve is opened and the liquid in the container is pressed, so that even when the liquid is of comparatively high viscosity, it can be discharged with ease.

A second embodiment of the present invention is shown in Figs. 5 and 6. This is a case in which the side surface of an outer sheath 18 corresponding to the outer sheath 15 of the first embodiment shown in Fig. 1 is pressed in the radial direction to open the valve and the interior of the container 1 is pressed. At the front portion of the outer sheath 18 there are formed U-shaped slits 19 so that pressure pieces 20 are formed to lie opposite to each other. Further, each of the pressure pieces 20 is provided with a projection 21 which can abut against a front shoulder 22 of the container 1. Further, unlike the first embodiment, the rear end of the outer sheath 18 is sealed with a tail plug 23 so that the backward movement of the container 1 is inhibited.

Next, the method of using a liquid discharge instrument according to this embodiment and the operation thereof will be described. When the pressure pieces 20 of the outer sheath 18 are pressed in the radial direction, the projections 21 of the pressure pieces 20 press the front shoulder 22 of the container 1 and by this pressing operation, the bellows portion 2 contracts and the portion ahead of the bellows portion 2 moves backward (downward in the drawing) and by this retrogression, the interior of the container 1 is pressurized and the valve rod 4 is pressed relatively so that the first valve portion 8a leaves away from the valve seat portion 3a to thereby provide the valve hole 3b. This is because the backward movement of the valve rod 4 is inhibited by the rear end of the container 1 and the tail plug 23. When the pressure pieces 20 are further pressed, the second valve portion 9a abuts against the rear end face of the valve seat portion 3a to close the valve hole 3b as in the case of the previous embodiment.

Further, the top end of the each of the projections 21 is tapered and the front shoulder portion 22 has an inclined surface so that the container 1 is moved backward with ease by the pressing operation of the pressure pieces 20.

In addition, in the instant embodiment, as in the case of the first embodiment, a clearance 6 is provided between the rear end of the valve rod 4 and the inner surface of the rear end of the container 1 so as to prevent the valve form being opened due to an unexpected application of pressure on the container.

A third embodiment of the present invention will be described with reference to Fig. 7. This embodiment aims at reducing the price of the target product. Reference numeral 24 designates a container body formed by blow-molding a material such as polyethylene, polypropylene, nylon, a copolymer of ethylene and vinyl alcohol and behind the container body 24 there is formed a bellows portion 25 capable of contraction and expansion in the longitudinal direction of the container body 24. Further, behind the bellows portion 25 there is provided a bottom 26 which forms itself a pressure portion 27. The central portion of the bottom 26 becomes depressed inwardly as at 28 with respect to the container body 1 and this depression 28 serves as a means for preventing a parting line generating at the time of molding from projecting from the surface of the bottom 26.

Further, the container body 24, the bellows portion 25 and the pressure portion 27 will be described presently in more detail. The thickness of the bellows portion 25 is made smaller than the thickness of the container body 24 and the pressure portion 27. By reducing the thickness of the bellows portion 25, the bellows portion 25 can be deformed easily and by increasing the thickness of the container body 24 and the pressure portion 27, the container body and the pressure portion are prevented from becoming unnecessarily deformed. That is, the possible deformation of the container body 24 in use is prevented by increasing the thickness of the container body 24. Further, with reference to the bellows portion 25, each of side portions 25a and each of outer ridges 25b of the bellows portion 25 are made thinner and each of inner ridges 25c of the bellows portion 25 is made thicker. Thus, by making the outer ridge 25b deformable while the inner ridge 25c is made to have a suitable degree of rigidity, the elasticity of the bellows portion 25 with respect to its contraction and expansion is improved. (see Fig. 8). On the contrary, however, each of the side portions 25a, each of the outer ridges 25b and each of the inner ridges 25c may be made to have the same thickness as shown in Fig. 9 because by so doing, the stress generating at the time of contraction and expansion of the bellows portion 25 scatters uniformly throughout the bellows portion so that the bellows portion 25 can be prevented from any breakage (cracking and the like) over a prolonged period of time.

To the opening at the distal end of the container body 24 there is attached a valve seat member 31 into which a drawing head fixing tube 30 having a drawing head 29 is press-fitted but this valve seat member 31 may be made integral with the container body 24. Inside the valve seat member 31 there is formed a valve seat

portion 31a and with respect to this valve seat portion 31a (valve seat member 31) , a valve rod 32 is constantly urged backward by means of a repulsive member 33 such as a coil spring stretched between it and the valve seat portion 31a (valve seat member 31). However, the repulsive member 33 may be arranged ahead of the valve rod 32 or may be made integral with the valve rod 32 or the valve seat member 31 as the case may be or it may be dispensed with only if the elasticity of the bellows portion 25 (effect of elasticity) is sufficiently strong.

The valve rod 32 extends through the container body 24 and between the rear end thereof and the inner wall of the rear end of the container body 24 (inside the depression 28 of the pressure portion 27) there is provided a small clearance 34.

Further, the valve rod 32 comprises a first valve rod 35 and a second hollow valve rod 36. The first valve rod 35 is provided at the distal end thereof with a first valve portion 35a capable of coming into contact with the front end face of the valve seat portion 31a and closing the valve hole 31b. On the other hand, the second valve rod 36 is provided at the distal end thereof with a second valve portion 36a capable of coming into contact with the rear end face of the valve seat portion 31a and closing the valve hole 31b.

At the bellows portion 25 behind the valve rod 32 there is interposed a stopper ring 37 for preventing the flexing of the valve rod 32. Further, the stopper ring 37 is provided with radially extending vertical grooves 38 for improving the circulation of a liquid (see Fig. 10). Further, reference numeral 39 designates a ball for agitating a toilet lotion within a container 24 but the ball 39 is not always necessary depending on the kind of liquid being used. Further, at the lower end of the drawing head fixing tube 30 and at the internal intermediate portion of the valve seat member 31, there is disposed a porous member 40 serving as a temporary liquid reservoir leading to the drawing head 29.

Next, the above-mentioned drawing head fixing tube 30 will be described. As shown in Figs. 11 and 12, the drawing head fixing tube 30 comprises a fixing tube halves 40 and 41 formed by vertically dividing the tube 30 in such a manner that each of the tube halves can flex on one side and connected to a base portion 42 of the tube on the other side. Further, at the center of the base portion 42 there is integrally erected a cylindrical pipe 43 to be inserted into the above-mentioned writing nib or drawing head 29. Thus, by making the drawing head fixing tube and the cylindrical pipe 43 integral with each other, the parts manufacturing cost can be reduced and by dividing the fixing tube into two parts, the insertion of the drawing head into the fixing tube is facilitated. Further, as a matter of cause, the production cost can be reduced by facilitating the operation of assembling the parts.

On the internal surface of each of the fixing tube halves 40 and 41 there are formed an air exchanging slit 44 and a groove 45 for stopping and fixing a welded portion 29a at the rear end of the drawing head 29. Further, on the side surface of the base end 42 there are formed air exchanging slits 46 in opposite relationship with each other.

With the above arrangement, when the drawing head fixing tube 30 is formed by bending the fixing tube halves 40 and 41 inward, the mating surfaces of the two halves come to provide an air exchanging slit 47 as shown in Fig. 11.

In Fig. 13, reference numeral 48 designates a cap removably attached to the container 24 by screw-fitting means. This cap 48 is of a double-cap structure comprising an outer cap 50 and an inner cap 51 connected through a plurality of ribs 9. By this double cap structure, even in case where a child has swallowed it, the circulation of air can be secured. Note that a circumferential groove 52 is formed inside the outer cap 50 for the purpose of allowing a head cap 53 to be inserted if so desired as shown in Fig. 14 because by so doing, the upper aperture of the cap 48 is closed to make the entire product good looking.

Further, as shown in Fig. 15, a screw-threaded portion 54 of the cap 48 is provided at the central portion thereof with a groove 55 along the helical portion thereof. This is a means provided for preventing the occurrence, at the time of injection-molding the cap, of a sink (i.e. the formation of a dent on the surface of a molded product immediately after molding due to the contraction of the volume of the product taking place more frequently at a large thickness portion than at a small thickness portion of the product) or for preventing the loosening of the cap itself.

Next, the method of using the liquid discharge instrument of the present invention and the operation thereof will be described. When the pressing portion 27 of the container body 24 is pressed, the bellows portion 25 contracts and the interior of the container body 24 is pressurized so that the inner surface (the concave portion 28) of the pressing portion 27 comes into contact with the rear end of the valve rod 32. In this case, if the pressing operation is kept continued, the first valve portion 35a leaves away from the front end face of the valve seat portion 31a to thereby from the valve hole 31b. Then, the liquid within the pressed container body 24 flows through the porous member 40 so as to be supplied to the drawing head 29. Consequently, the supply of the liquid within the pressed container body 24 to the porous member 40 is interrupted.

Fig. 16 shows an example in which there is provided inside a container body 56 a soft bag 57 which contracts in sequence according to the use of a liquid (a toilet lotion). In the case of this example, the bag 57 for storing the liquid contracts due to a decrease in the amount of the liquid so that not only air but also various kinds of bacteria contained in the air are not mixed in the liquid so that the container is quite sanitary and the drying of the liquid is also prevented.

Further, Fig. 17 shows an example in which a comb-tooth shaped coating head 58 instead of the bundle of fibers in the example 1 is attached to the distal end of the container. This coating head is mainly used for a hair coloring instrument. Thus, various kinds of coating heads can be attached.

The liquid discharge instrument according to the first embodiment of the present invention has the structure such that a liquid is received in a container whose volume can vary to decrease and recover, a valve comprising a valve seat portion and a valve rod having a valve portion capable of repulsively contacting the valve seat portion and extending up to the rear portion of the container is disposed in an opening of the distal end of the container and when the rear end of the container is pressed, the valve rod moves forward and the container deforms to open the valve portion to thereby discharge the liquid outside the container, and is characterized in that the valve rod is provided with a second valve portion at the intermediate portion thereof so that when the valve rod moves forward, the valve is closed. The liquid discharge instrument according to the second embodiment of the present invention has the structure such that a liquid is received in a container whose volume can vary to reduce and recover, a coating member is provided at the distal end of the container and a bellows portion capable of expansion and contraction is formed integral with a portion of the container with the thickness of the bellows portion being made smaller than that of the remaining portion. Further, the liquid discharge instrument according to the third embodiment of the present invention has the structure such that a liquid is received in a container capable of reducing and recovering its volume and a coating head comprising a bundle of fibers is attached to the distal end of the container wherein the coating head is attached to the container through a fixing tube which are split into two halves connected to each other at the base thereof and capable of flexing at the free ends thereof and further, a tubular portion to be fitted in the coating head is formed integral with the base. Thus, with such a structure, even when the valve rod is kept moving forward, it is possible to prevent the liquid from dripping. Further, an inexpensive product can be obtained according to the second and thirds embodiments.

Claims

1. A liquid discharge instrument comprising:

   a liquid container capable of reducing and recovering the volume thereof and having an opening at a distal end thereof; and
   a valve comprising a valve seat and a valve rod having a first valve portion capable of repulsively contacting the valve seat and a second valve portion at the intermediate portion thereof and extending up to a rear portion of said valve rod,

   whereby when the rear end of the container is pressed, the valve rod moves forward to deform the container so that the valve is opened to allow the liquid in the container to be discharged outside the container through said opening and when the valve rod moves forward further, said second valve portion closes the valve.

2. A liquid discharge instrument according to Claim 1 wherein said container is provided with a coating member at a distal end thereof and a bellows portion formed integral with a portion of the container so as to expand and contract, with the thickness of the bellows portion being made smaller than that of the remaining portion of the container.

3. A fluid discharge instrument according to Claim 1, wherein said container is provided at a distal end thereof with a drawing head in the form of a bundle of fibers through a fixing tube and said fixing tube is constructed such that it is vertically split into two halves which are connected to a base portion of said tube while top ends thereof are separated and made flexible and wherein said base portion of the fixing tube is provided with a tubular portion which is formed integral with said fixing tube so as to be inserted into said drawing head.

FIG. 1

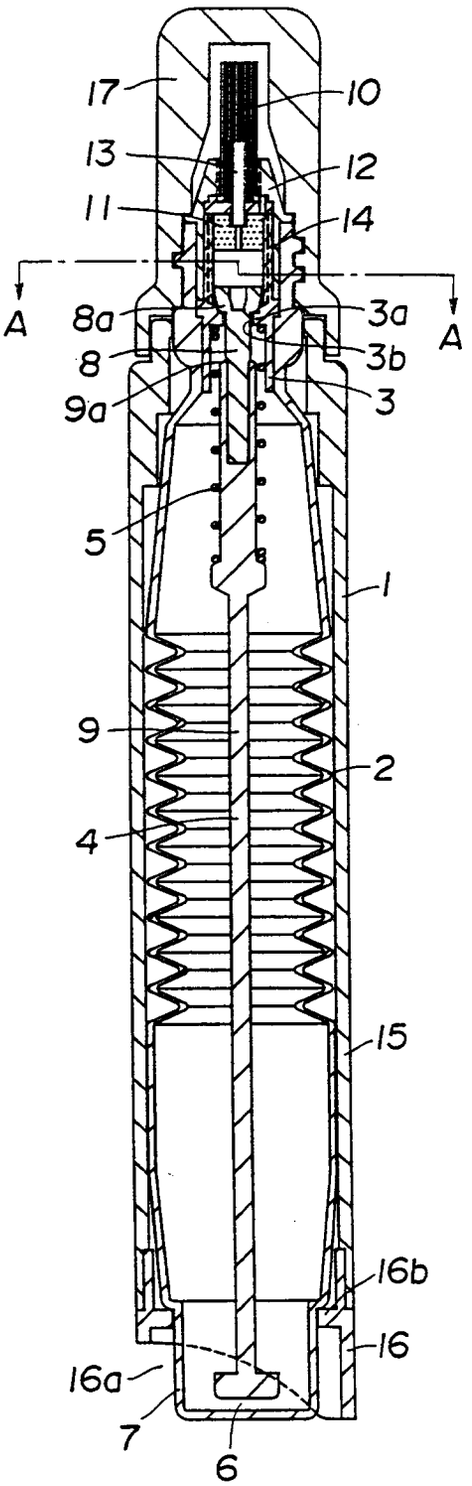


FIG. 2

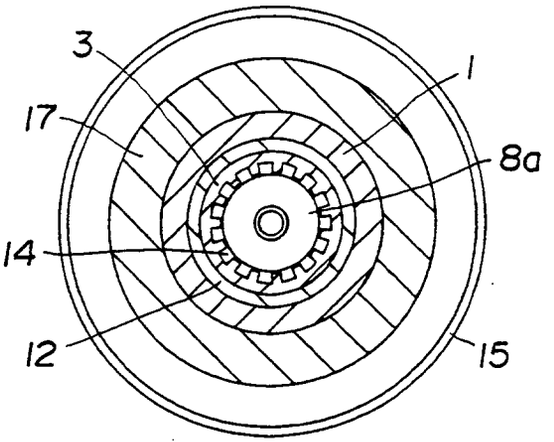


FIG. 3

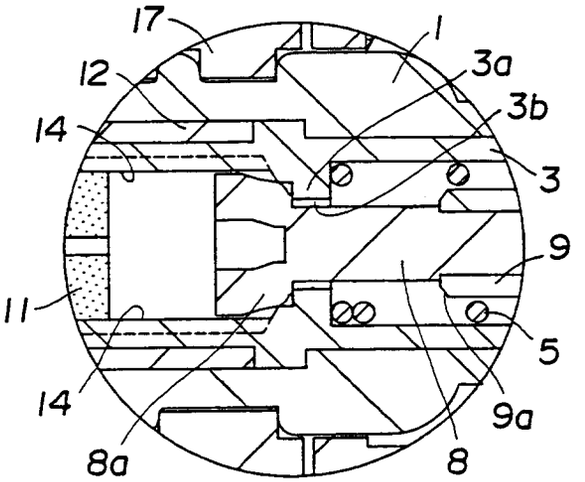


FIG. 4

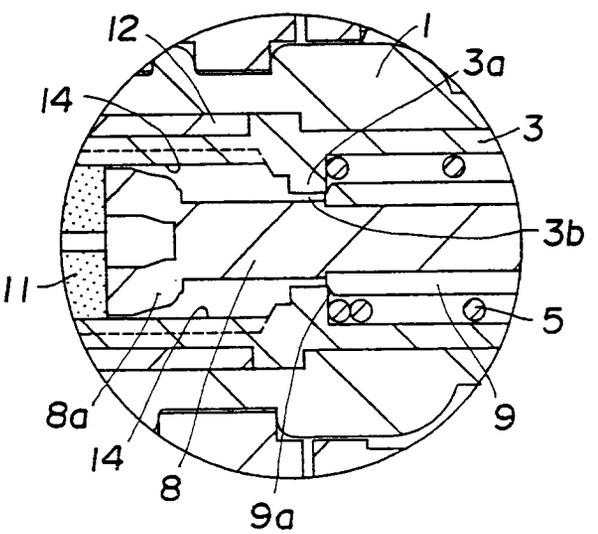


FIG. 5

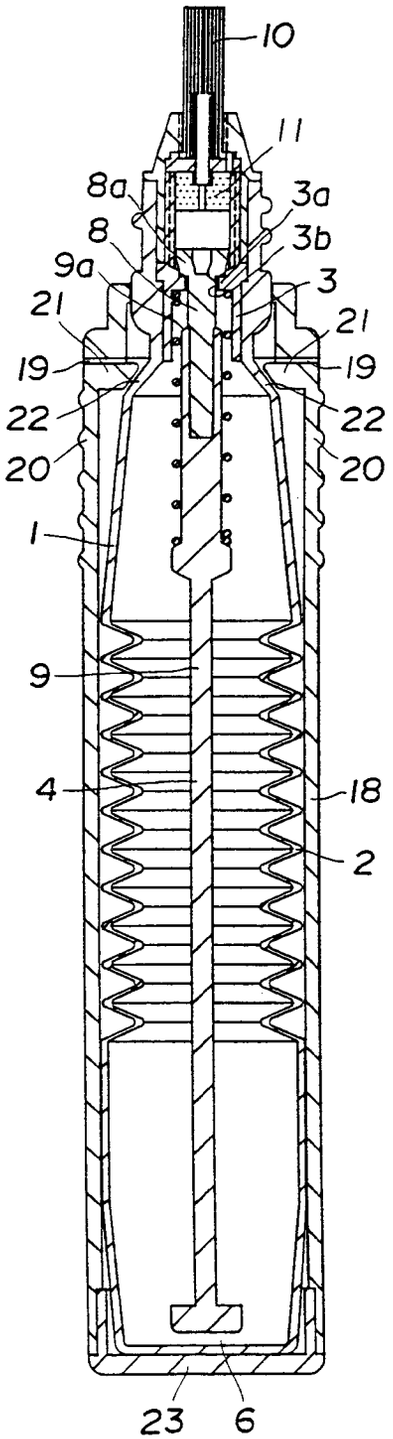


FIG. 6

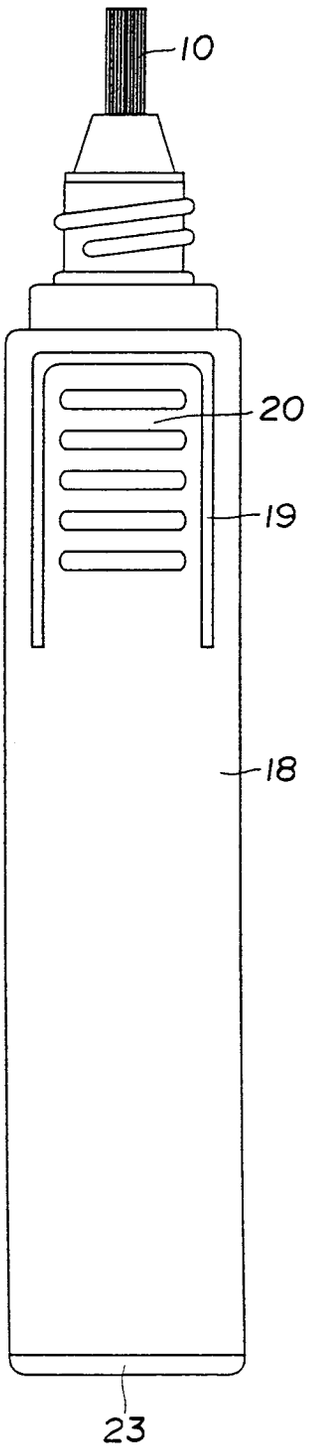


FIG. 7

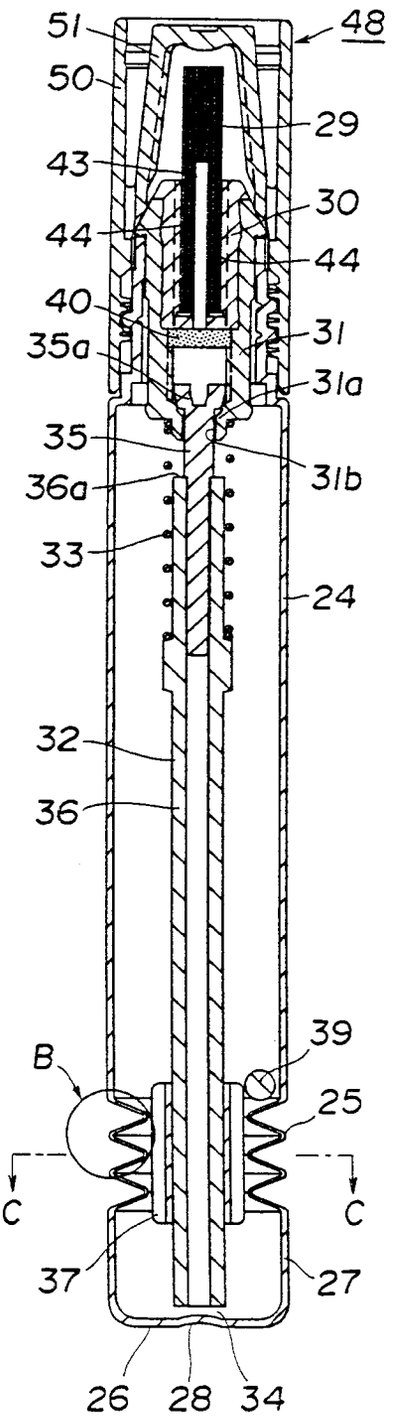


FIG. 8

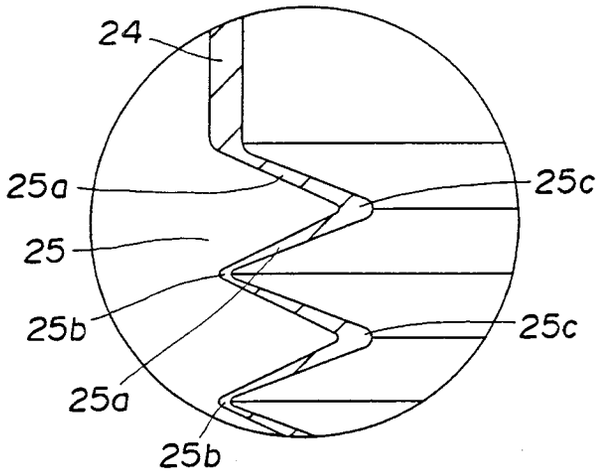


FIG. 9

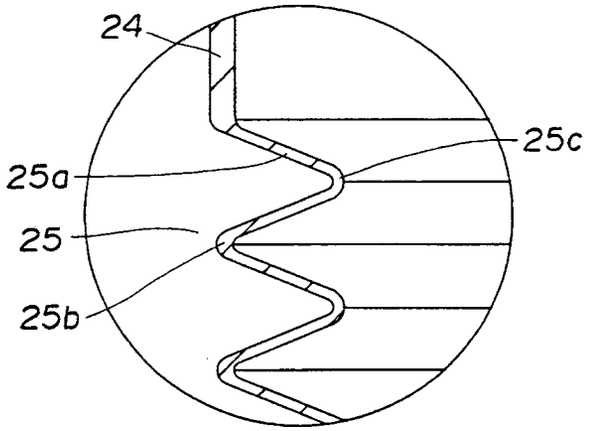


FIG. 10

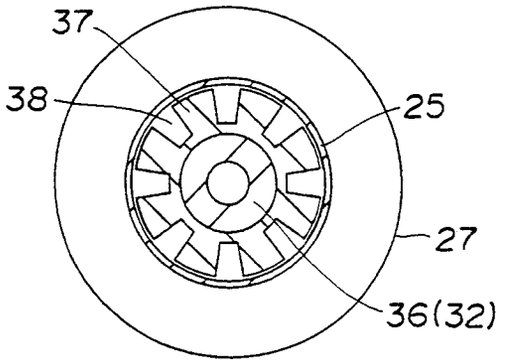


FIG. 11

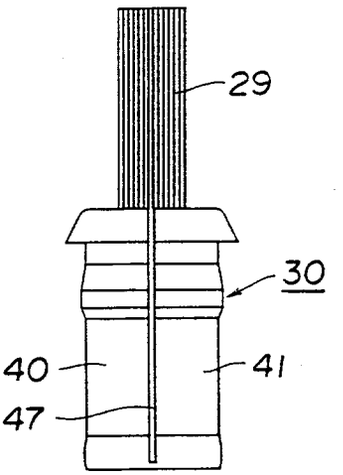


FIG. 12

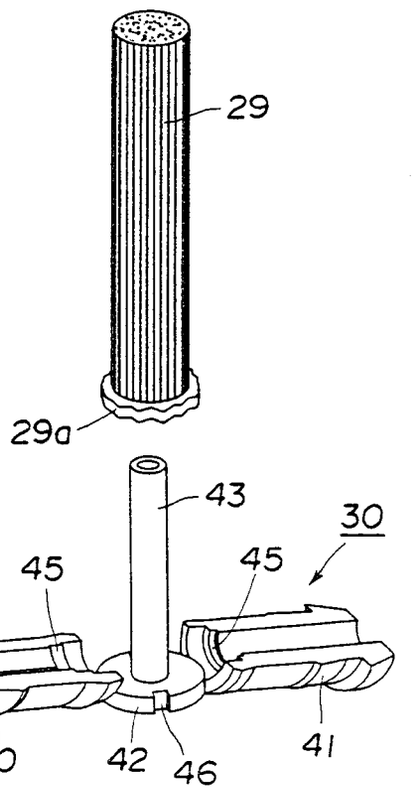


FIG.13

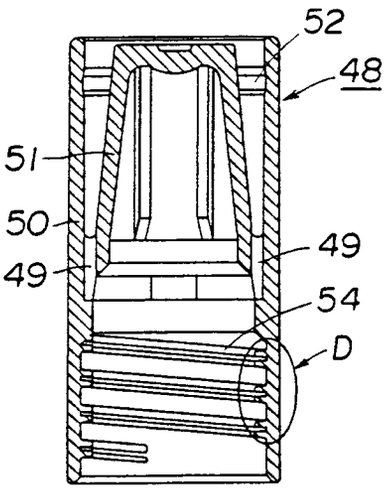


FIG.14

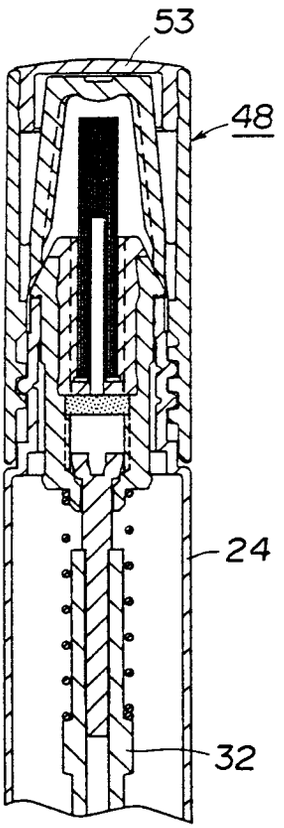


FIG.16

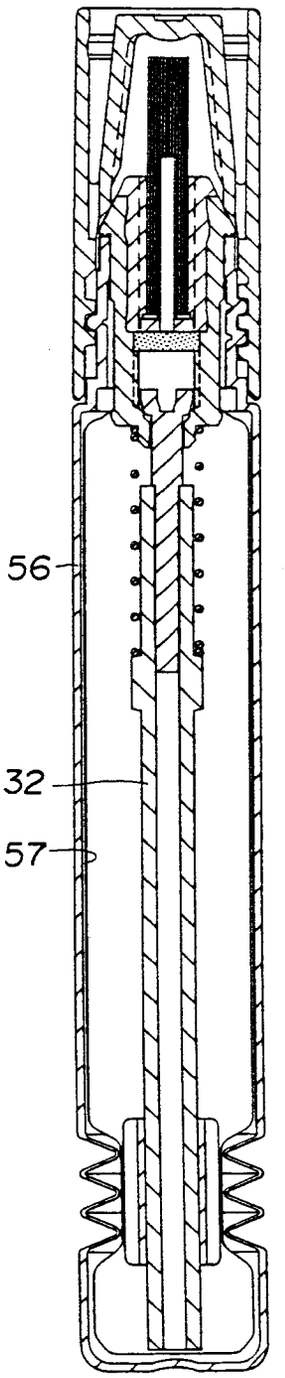


FIG.15

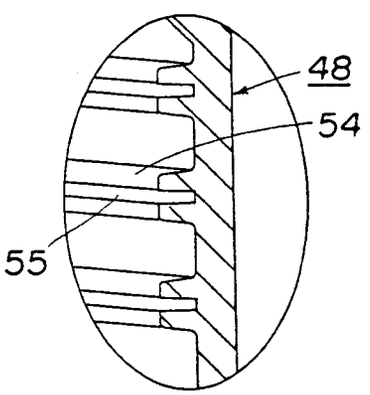
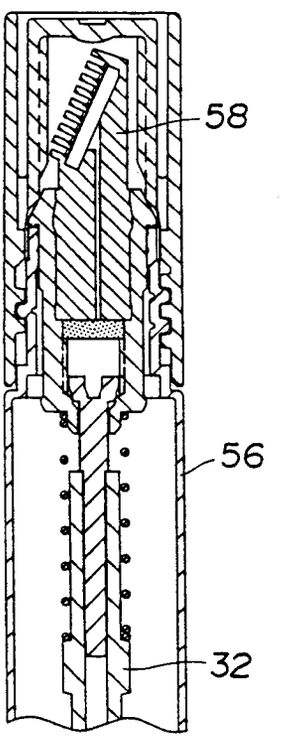


FIG.17



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP97/00970

A. CLASSIFICATION OF SUBJECT MATTER
Int. Cl^6 B65D47/42, B65D83/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
Int. Cl^6 B65D39/00-55/16, B65D83/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho	1926 - 1997
Kokai Jitsuyo Shinan Koho	1971 - 1997
Toroku Jitsuyo Shinan Koho	1994 - 1996

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP, 63-1674, U (Mitsubishi Pencil Co., Ltd.), January 7, 1988 (07. 01. 88), Page 1, left column, lines 2 to 11; Fig. 2 (Family: none)	2
Y		1
X	JP, 61-217374, A (Riso Kagaku Corp.), September 26, 1986 (26. 09. 86), Page 2, lower left column, lines 16 to 20 (Family: none)	2
Y	JP, 52-149869, A (Trisa Burstenfabrik AG. Triengen), December 13, 1977 (13. 12. 77), Page 5, upper right column, line 14 to page 6, upper left column, line 11; Figs. 4, 5 & PT, 66549, A & IL, 52153, A & BE, 855446, A & DK, 249777, A & NO, 771963, A & FI, 771729, A & SE, 7706443, A & NL, 7705882, A & DE, 2725495, A & FR, 2354145, A	1

[X] Further documents are listed in the continuation of Box C. [ ] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
May 1, 1997 (01. 05. 97)	May 13, 1997 (13. 05. 97)
Name and mailing address of the ISA/ Japanese Patent Office	Authorized officer
Facsimile No.	Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP97/00970

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	JP, 5-49074, U (Pentel Co., Ltd.), June 29, 1993 (29. 06. 93), Fig. 1 (Family: none)	1 - 3
A	JP, 63-160987, A (Sakura Color Products Corp.), October 20, 1988 (20. 10. 88), Figs. 1, 2, 3 (Family: none)	1 - 3
A	JP, 1-58450, U (Marina K.K.), April 12, 1989 (12. 04. 89), Figs. 5, 6 (Family: none)	1 - 3

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