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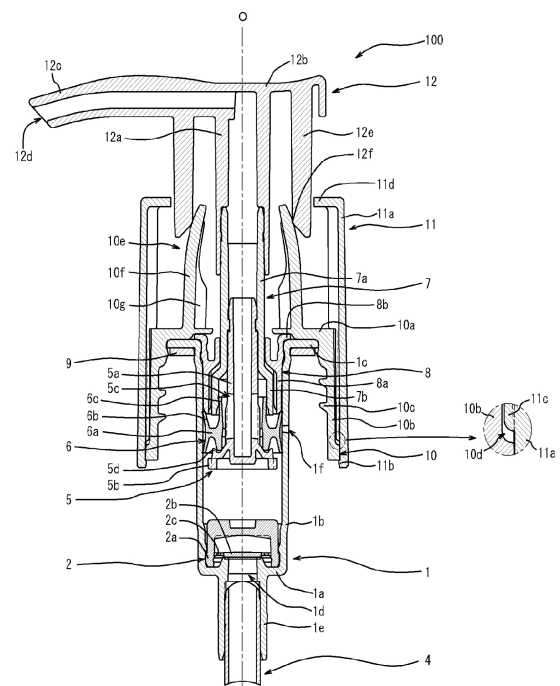
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(54) **PUMP-TYPE DISPENSER**

(57) Proposed is a pump-type dispenser that can discharge a content liquid in the same manner as the conventional art and is further good in recyclability.

A pump-type dispenser (100) includes a pump that is driven by forward and backward movement of a stem (7a); and a head (12) that has a discharge port (12d) and is coupled to the stem (7a), in which one of the head (12) and the cap (10) is provided with an extension portion (12e) extending toward the other of the head (12) and the cap (10), the other of the head (12) and the cap (10) is provided with an elastic piece (10e) that is bent by the extension portion (12e) when the head (12) is moved forward toward the cap (10), the elastic piece (10e) includes an elastic piece main body (10f) and a reinforcing rib (10g), and the reinforcing rib (10g) includes a rib root portion (10j) and a rib gradually changing portion (10k).

FIG. 1



Description

Technical Field

[0001] The present invention relates to a pump-type dispenser. 5

Background Art

[0002] A known pump-type dispenser includes a cap 10 attached to a mouth of a container, a pump held at the mouth by the cap and driven by forward and backward movement of a stem, and a head connected to the stem, and discharges a content liquid in the container from a discharge port of the head by moving the head toward the cap (see, for example, Patent Literature 1).

[0003] As disclosed in Patent Literature 1, a coil spring is provided inside such a pump-type dispenser in order to return the head moved toward the cap to an initial position. 15 20

Citation List

Patent Literature

[0004] Patent Literature 1: JP 2011-31950 A 25

Summary of Invention

Technical Problem

[0005] In such a pump-type dispenser, most of the members are made of synthetic resin, but the coil spring is made of metal. For this reason, in discarding after use, such a pump-type dispenser cannot be recycled as a resin product as it is. In general, in this type of pump-type dispenser, the members are firmly fixed to each other by, for example, fitting in order to avoid detachment of the members during normal use. Therefore, it takes time and effort to disassemble the pump-type dispenser and sort the coil spring and other members. 30 35

[0006] The present invention was accomplished to solve such a problem, and it is an object of the present invention to propose a pump-type dispenser that is capable of discharging a content liquid in a similar manner to the conventional art and is further excellent in recyclability. 40 45

Solution to Problem

[0007] The present invention provides a pump-type dispenser including:

a cap attached to a mouth of a container that stores a content liquid; 55
a pump that is held at the mouth by the cap and is driven by forward and backward movement of a

stem; and

a head that has a discharge port for discharging the content liquid to an outside and is coupled to the stem, in which

the content liquid in the container is discharged through the discharge port by moving the head toward the cap,

one of the head and the cap is provided with an extension portion extending toward the other of the head and the cap,

the other of the head and the cap is provided with an elastic piece that is bent by the extension portion when the head is moved forward toward the cap,

the elastic piece includes an elastic piece main body and a reinforcing rib that is narrower than the elastic piece main body, and

the reinforcing rib includes a rib root portion located on a root side of the reinforcing rib and a rib gradually changing portion whose thickness gradually decreases from the rib root portion toward a tip side of the reinforcing rib. In the present specification and others, the rib gradually changing portion whose thickness gradually decreases is not limited to one whose thickness changes along a single straight line or curve, and encompasses one whose thickness changes stepwise (in steps). 25 30

[0008] It is preferable that in a state where the head has moved to a forward limit, a tip side end portion of the rib root portion is located at a same position in a front-back direction as a contact portion of the extension portion with the elastic piece or located on a root side of the reinforcing rib relative to the contact portion. 35

[0009] It is preferable that when a length in the front-back direction from a root side end portion of the reinforcing rib to a tip side end portion of the extension portion in a state where the head has moved to a backward limit is L, and a length in the front-back direction from the root side end portion of the reinforcing rib to a tip side end portion of the rib root portion in a state where the head and the cap are not combined and the elastic piece and the extension portion are not in contact with each other is L1, the following formula (1) is satisfied: 40 45

$$0.3 \times L \leq L1 \leq 0.6 \times L \dots (1)$$

[0010] It is preferable that the extension portion includes an arc-shaped inner circumferential portion that comes into contact with the elastic piece to bend the elastic piece, 50

the elastic piece includes an arc-shaped outer circumferential portion with which the arc-shaped inner circumferential portion comes into contact, and a radius of curvature of the arc-shaped outer circumferential portion is smaller than a radius of cur-

vature of the arc-shaped inner circumferential portion.

Advantageous Effects of Invention

[0011] According to the pump-type dispenser of the present invention, when the head is moved toward the cap, the elastic piece is bent by the extension portion, and therefore the head can be returned to the initial position when the bent elastic piece recovers. When an elastic piece that is flexurally deformable is constantly bent with a relatively large force, the elastic piece may lose elasticity, leading to deterioration of recoverability. On the other hand, the elastic piece of the present invention includes the elastic piece main body and the reinforcing rib, and the reinforcing rib includes the rib root portion located on the root side and the rib gradually changing portion whose thickness gradually decreases from the rib root portion toward the tip side of the reinforcing rib. That is, the root side of the elastic piece is thick due to the rib root portion, while the tip side of the elastic piece is thinner than the root side. Therefore, in a state where the head has not been operated (a state where the head is at the backward limit and the extension portion is in contact with the tip side of the elastic piece), the tip side of the elastic piece is easily bent, while the root side of the elastic piece is hardly bent. Therefore, it is possible to embody a pump-type dispenser that is less likely to be affected by decrease of elasticity by adjusting the thickness or the like of the root side of the elastic piece so that the elastic force for returning the head after the content is discharged is mainly exerted on the root side of the elastic piece. Since no pressing force acts on the head in the state where the head is at the backward limit and the extension portion is in contact with the tip side of the elastic piece, the force acting on the tip side of the elastic piece is also small. Therefore, influence of decrease of elasticity on the tip side of the elastic piece that remains bent in the state the head has not been operated can also be lessened. In addition, since the reinforcing rib includes the rib gradually changing portion, resistance force does not suddenly change while the pressing force is applied to the head, and good operability is obtained.

[0012] Further, according to the pump-type dispenser of the present invention, the elastic piece as described above is used instead of a metal coil spring, and it is therefore unnecessary to sort metal parts at the time of disposal unlike the conventional pump-type dispenser, and the pump-type dispenser of the present invention can be reused as a resin product and is therefore good in recyclability.

Brief Description of Drawings

[0013]

Fig. 1 is a cross-sectional view illustrating a state where an elastic piece has not been bent as viewed in side view in an embodiment of a pump-type dispenser according to the present invention.

Fig. 2 is a perspective view concerning the vicinity of the elastic piece illustrated in Fig. 1.

Fig. 3 is a plan view illustrating the elastic piece illustrated in Fig. 1.

Fig. 4 is a cross-sectional view taken along line A-A in Fig. 3.

Fig. 5 is a cross-sectional view of the pump-type dispenser illustrated in Fig. 1 as viewed in side view in a state where a head has been pressed.

Fig. 6 is a partial enlarged view concerning the vicinity of the elastic piece illustrated in Fig. 5.

Description of Embodiments

[0014] Hereinafter, a pump-type dispenser 100 which is an embodiment of a pump-type dispenser according to the present invention will be described with reference to the drawings. In the present specification and others, an up-down direction is a direction along an illustrated central axis O (a central axis of a stem 7a to be described later), and a side on which a pipe 4 is located is a "lower" side and a side on which a head 12 is located is an "upper" side. In the present specification and others, it is assumed that the head 12 moves forward when the head 12 is pressed and moves downward, and that the head 12 moves backward when the pressed head 12 returns upward. Therefore, in the following description, the up-down direction described above may be referred to as a front-back direction. A radial direction is a direction orthogonal to the central axis O in a plane perpendicular to the central axis O, and a circumferential direction is a direction around the central axis O in this plane.

[0015] The pump-type dispenser 100 of the present embodiment is used by being attached to a mouth of a container (not illustrated) having a bottle shape. A content liquid to be discharged by the pump-type dispenser 100 is, for example, a cosmetic product (for example, emulsion or lotion), shampoo, body soap, hand soap, facial cleanser, or the like.

[0016] The pump-type dispenser 100 includes a cylinder 1, a valve member 2, a pipe 4, an inner member 5, a piston 6, a cylindrical member 7, a holder 8, a packing 9, a cap 10, a cover 11, and a head 12. Here, the cylinder 1, the valve member 2, the inner member 5, the piston 6, the cylindrical member 7, and the holder 8 are members constituting a "pump" in the present specification and others. Among the above members, the valve member 2, the piston 6, and the packing 9 are formed of a soft synthetic resin (for example, polyethylene (LDPE, HDPE, foamed PE)) having elasticity, and the other members are formed of a hard synthetic resin (for example, polypropylene (PP), polybutylene terephthalate (PBT), polyacetal (POM), polyketone (POK)

resin, or the like). Each member constituting the pump-type dispenser 100 is basically formed in a shape centered on the central axis O.

[0017] The cylinder 1 includes a bottom wall portion 1a having a disk shape and having a central portion protruding upward, a cylindrical wall portion 1b standing upright from an outer edge portion of the bottom wall portion 1a, and a flange wall 1c extending radially outward from an upper portion of the cylindrical wall portion 1b. A through hole (suction port 1d) is provided in the protruding central portion of the bottom wall portion 1a. A cylindrical holding cylinder 1e that surrounds the suction port 1d and extends downward to hold the pipe 4 is provided on a lower surface of the bottom wall portion 1a. A through hole (ventilation port 1f) is provided in the cylindrical wall portion 1b.

[0018] The valve member 2 includes a base portion 2a, a valve body portion 2b that covers the suction port 1d inside the base portion 2a and is seated on an upper surface of the bottom wall portion 1a, and an elastically deformable coupling piece 2c that couples the base portion 2a and the valve body portion 2b. The valve member 2 functions as a check valve, and when the pressure in the cylinder 1 is reduced, the valve body portion 2b closing the suction port 1d is separated from the bottom wall portion 1a to open the suction port 1d.

[0019] In the present embodiment, the base portion 2a has a lidded cylindrical shape and has a form in which a central portion on an upper surface thereof protrudes upward, and includes an opening (not illustrated) through which the content liquid having passed through the suction port 1d passes. The base portion 2a is fitted and held on an inner circumferential surface of the cylindrical wall portion 1b, and thereby the valve member 2 is held in the cylinder 1.

[0020] The pipe 4 has a hollow shape, and an upper end portion thereof is inserted into the holding cylinder 1e and fitted and held therein.

[0021] The inner member 5 is a member that is disposed inside the cylinder 1 and moves up and down with respect to the cylinder 1. The inner member 5 includes a cylindrical coupling cylinder 5a and a bottom portion 5b that closes a lower end portion of the coupling cylinder 5a and extends radially outward. In addition, the coupling cylinder 5a is provided with a hole (communication port 5c) penetrating the coupling cylinder 5a, and an annular portion 5d located radially outside a coupling portion with the coupling cylinder 5a is provided on an upper surface of the bottom portion 5b.

[0022] The piston 6 is inserted into the coupling cylinder 5a and disposed inside the cylinder 1. The piston 6 of the present embodiment includes an annular base portion 6a. An outer sliding piece 6b extending upward and downward from the base portion 6a is provided on an outer edge portion of the base portion 6a. The outer sliding piece 6b is in liquid-tight contact with an inner circumferential surface of the cylindrical wall portion 1b in a slidable manner. An inner sliding piece 6c extend-

ing upward and downward from the base portion 6a is provided on an inner edge portion of the base portion 6a. A lower portion of the inner sliding piece 6c is in liquid-tight contact with a lower portion of the coupling cylinder 5a that protrudes radially outward, and an upper portion of the inner sliding piece 6c is in liquid-tight contact with an inner circumferential surface of an enlarged diameter portion 7b (described later) of the cylindrical member 7 in a slidable manner.

[0023] The cylindrical member 7 is a member having a cylindrical shape as a whole. The cylindrical member 7 includes a stem 7a having a cylindrical shape, and the enlarged diameter portion 7b coupled to a lower end portion of the stem 7a and having a larger diameter than the stem 7a. When the coupling cylinder 5a is inserted into the stem 7a, the coupling cylinder 5a and the stem 7a are fitted to each other, so that the inner member 5 and the cylindrical member 7 move integrally with respect to the cylinder 1.

[0024] The holder 8 has a portion located radially outside the stem 7a and a portion located radially outside the enlarged diameter portion 7b, and includes a holder base portion 8a fitted and held on the inner circumferential surface of the cylindrical wall portion 1b. A flange 8b extending radially outward is provided at an upper end of the holder base portion 8a. The holder 8 prevents the inner member 5, the piston 6, and the cylindrical member 7 from coming out of the cylinder 1.

[0025] The packing 9 has an annular plate shape, and is inserted into the cylindrical wall portion 1b of the cylinder 1 and fitted and held therein. When the pump-type dispenser 100 is attached to a container (not illustrated), the packing 9 is held between a mouth of the container and the flange wall 1c. As a result, for example, when the container falls over, troubles such as overflowing of the content liquid from the mouth are prevented.

[0026] The cap 10 has a disk-like shape and includes a top wall 10a having a through hole at a central portion thereof. A cylindrical circumferential wall 10b extending downward is provided on an outer edge portion of the top wall 10a. An upper portion of an inner circumferential surface of the circumferential wall 10b bulges radially inward and can fittingly hold the flange wall 1c, and thereby the cylinder 1 is held by the cap 10. Further, an inner circumferential surface of the cap 10 is provided with a female screw portion 10c screwed onto a male screw portion provided at the mouth of the container, and the cap 10 can be attached to the container by screwing the male screw portion and the female screw portion 10c. As illustrated in the partially enlarged view of Fig. 1, a rotation preventing recess 10d extending in the up-down direction is provided on an outer circumferential surface of the circumferential wall 10b. A plurality of rotation preventing recesses 10d are provided at intervals in the circumferential direction.

[0027] The cap 10 includes an elastic piece 10e that extends upward from an upper surface of the top wall

10a and is elastically deformable radially inward (see Figs. 2, 3, and 4). Note that the solid lines in Figs. 3 and 4 indicate a state where the elastic piece 10e is not bent (a state where the cap 10 and the head 12 are not combined and the elastic piece 10e is not in contact with an extension portion 12e, which will be described later). In the present embodiment, a total of six elastic pieces 10e are provided at equal intervals in the circumferential direction. As described later, the elastic pieces 10e are elastically deformed by the head 12 pressed when the contents are discharged, and return the head 12 with a restoring force when the pressing force applied to the head 12 is released.

[0028] Each of the elastic pieces 10e includes an elastic piece main body 10f having a plate shape and a reinforcing rib 10g narrower than the elastic piece main body 10f (having a shorter circumferential length than the elastic piece main body 10f). The reinforcing rib 10g is provided at both circumferential ends of the elastic piece main body 10f. As illustrated in Fig. 3, the elastic piece main body 10f of the present embodiment has an arc-shaped outer circumferential portion 10h having an arc shape (radius of curvature Ra).

[0029] As illustrated in Fig. 4, the reinforcing rib 10g includes a rib root portion 10j located on a root side of the reinforcing rib 10g, a rib gradually changing portion 10k whose thickness gradually decreases from the rib root portion 10j toward a tip side of the reinforcing rib 10g, and a rib tip portion 10m extending from the rib gradually changing portion 10k toward the tip side of the reinforcing rib 10g. As illustrated in the drawing, a thickness (radial length) of the rib root portion 10j is substantially constant from a root side end portion 10n of the reinforcing rib 10g to a tip side end portion 10p of the rib root portion 10j, and is substantially the same as a thickness of the elastic piece main body 10f. As illustrated in Fig. 4, the rib gradually changing portion 10k extends from the tip side end portion 10p of the rib root portion 10j to a tip side end portion 10q of the rib gradually changing portion 10k while being slightly curved so as to gradually decrease in thickness. The rib tip portion 10m extends from the tip side end portion 10q of the rib gradually changing portion 10k to a tip side end portion 10r of the rib tip portion 10m so as to have a substantially constant thickness. The tip side end portion 10r of the rib tip portion 10m is located on the root side relative to a tip side end portion 10s of the reinforcing rib 10g.

[0030] When an elastic piece that is flexurally deformable is constantly bent with a relatively large force, the elastic piece may lose elasticity, leading to deterioration of recoverability. In view of such a problem, in the present embodiment, the thickness of the root side of the elastic piece 10e is made thicker by the rib root portion 10j, and the thickness of the tip side is made thinner than that of the root side. Therefore, the tip side of the elastic piece 10e is easily bent, whereas the root side of the elastic piece 10e is hardly bent, so that

elasticity of the root side of the elastic piece 10e is less likely to be lost. In the elastic piece 10e of the present embodiment, the elastic force for returning the head 12, including the thickness of the rib root portion 10j, is adjusted so as to be mainly exerted on the root side of the elastic piece 10e.

[0031] The cover 11 includes a cylindrical cover circumferential wall 11a. The cover circumferential wall 11a surrounds the circumferential wall 10b and the elastic pieces 10e. A retaining projection 11b that protrudes radially inward and engages with a lower end portion of the circumferential wall 10b is provided at a lower end portion of the cover circumferential wall 11a. A rib 11c extending in the up-down direction is provided on an inner circumferential surface of the cover circumferential wall 11a. A lower portion of the rib 11c is engaged with the rotation preventing recess 10d, and thus the cover 11 is held by the cap 10 so that rotation of the cover 11 is prevented. An upper portion of the rib 11c protrudes radially inward relative to the lower portion. A lower end surface of the upper portion comes into contact with the upper surface of the top wall 10a, and the retaining projection 11b is engaged with the lower end portion of the circumferential wall 10b as described above, and thereby the cover 11 is retained by the cap 10. An inward flange 11d extending radially inward is provided at an upper end portion of the cover circumferential wall 11a.

[0032] The head 12 has a cylindrical shape, and includes a cylindrical portion 12a into which the stem 7a is inserted and fitted and held. An upper portion of the cylindrical portion 12a is provided with a top portion 12b having an upper surface recessed downward and having a passage communicating with the cylindrical portion 12a. The top portion 12b is provided with a nozzle 12c that has a cylindrical shape, extends radially outward, and leads to a passage provided inside the top portion 12b. A discharge port 12d through which the content liquid is discharged by the pump-type dispenser 100 is provided at a tip of the nozzle 12c.

[0033] The head 12 includes the extension portion 12e extending downward from the top portion 12b and the nozzle 12c. The extension portion 12e of the present embodiment has a cylindrical shape centered on the central axis O. As illustrated in Fig. 1, a lower portion of the extension portion 12e is inclined so as to spread radially outward as the lower portion extends generally downward, and an inner edge portion of the inclined portion comes into contact with outer circumferential surfaces of the elastic pieces 10e (the elastic piece main bodies 10f). The portion of the extension portion 12e in contact with the elastic pieces 10e is referred to as a contact portion 12f. As illustrated in Fig. 3, an inner circumferential surface of a portion of the extension portion 12e where the contact portion 12f is provided is referred to as an arc-shaped inner circumferential portion 12g, and a radius of curvature of the arc-shaped inner circumferential portion 12g is re-

ferred to as Rb. In the present embodiment, the radius of curvature Ra of the arc-shaped outer circumferential portion 10h of the elastic piece 10e described above is set to be smaller than the radius of curvature Rb of the arc-shaped inner circumferential portion 12g.

[0034] In the pump-type dispenser 100 configured by such members, before the head 12 is pressed, the contact portion 12f of the extension portion 12e is in contact with the elastic pieces 10e, and the head 12 is at a rising limit (backward limit), as illustrated in Fig. 1. Each of the elastic pieces 10e of the present embodiment is thicker on the root side due to the rib root portion 10j of the reinforcing rib 10g, and is thinner on the tip side than on the root side. Therefore, before the head 12 is pressed, the tip side of the elastic piece 10e is bent, while the root side of the elastic piece 10e is less likely to be bent, as illustrated in Fig. 1. In the elastic piece 10e of the present embodiment, the elastic force for returning the head 12, including the thickness of the rib root portion 10j, is adjusted so as to be mainly exerted on the root side of the elastic piece 10e as described above, and therefore influence of decrease in elasticity can be reduced while securing the function of returning the head 12. In addition, since the force acting on the tip side of the elastic piece 10e is small before the head 12 is pressed in the state where the head 12 is at the rising limit, it is possible to alleviate the influence of decrease of elasticity on the tip side of the elastic piece 10e that remains bent as illustrated in Fig. 1.

[0035] Then, when the head 12 is pressed from above to lower the head 12 (move the head 12 forward toward the cap 10), the stem 7a is pushed down together with the head 12 (the stem 7a is moved forward toward the cap 10 along the central axis O). In addition, as the stem 7a is pushed down, the bottom portion 5b also descends along with the coupling cylinder 5a, so that the liquid-tight contact between the annular portion 5d and the lower portion of the inner sliding piece 6c is released. When the head 12 is further pushed down, the piston 6 also descends together with the cylindrical member 7 and the inner member 5, and the inside of the cylinder 1 is pressurized. Therefore, the content liquid in the cylinder 1 passes through the communication port 5c, passes through the coupling cylinder 5a, the stem 7a, the cylindrical portion 12a, the passage provided inside the top portion 12b, and the inside of the nozzle 12c, and is then discharged through the discharge port 12d to the outside. When the piston 6 descends below the ventilation port 1f by pressing of the head 12, the container (not illustrated) communicates with the outside through the ventilation port 1f. As a result, even when the content liquid stored in the container decreases, the inside of the container is not negatively pressurized, and a trouble of deforming the container in a crushed manner is prevented.

[0036] Further, when the head 12 is pushed down, the contact portion 12f of the extension portion 12e in contact with the elastic pieces 10e applies a pressing

force to the elastic pieces 10e, so that the elastic pieces 10e are bent radially inward as illustrated in Fig. 5. The reinforcing rib 10g of the present embodiment includes the rib gradually changing portion 10k (see Fig. 6), and the thickness of the reinforcing rib 10g gradually changes toward the rib root portion 10j, and therefore resistance force does not suddenly change while the pressing force is applied to the head 12, and good operability is obtained.

[0037] As illustrated in Fig. 2, the radius of curvature Ra of the arc-shaped outer circumferential portion 10h of each of the elastic pieces 10e is set to be smaller than the radius of curvature Rb of the arc-shaped inner circumferential portion 12g. That is, as compared with a case where the radius of curvature Ra is equal to the radius of curvature Rb, a contact area between the contact portion 12f and the elastic piece 10e is reduced, and sliding resistance generated when pushing the head 12 down is reduced, so that an excessive force is not required to push the head 12.

[0038] Thereafter, when the pressing to the head 12 is released, the elastic force of the elastically deformed elastic pieces 10e acts on the head 12, and the head 12 starts to rise. Accordingly, the piston 6 rises together with the inner member 5 while the lower portion of the coupling cylinder 5a protruding radially outward and the lower portion of the inner sliding piece 6c are in liquid tight contact with each other again, so that the inside of the cylinder 1 is depressurized. As a result, the valve body portion 2b is separated from the bottom wall portion 1a to open the suction port 1d, and thus the content liquid in the container can be sucked into the cylinder 1 through the pipe 4.

[0039] As described above, according to the pump-type dispenser 100 of the present embodiment, the head 12 can be returned after the content liquid is discharged without using a metal coil spring, and the pump-type dispenser 100 can be used in the same manner as a conventional pump-type dispenser.

[0040] As a result of repeated studies by the inventors of the present invention on decrease in elasticity of the elastic pieces 10e described above, it has been recognized that the influence of the decrease in elasticity can be reduced by appropriately setting the elastic pieces 10e and the extension portion 12e. This point will be described in detail with reference to Figs. 4 and 6.

[0041] In Fig. 4, the imaginary line indicates the extension portion 12e in a state where the head 12 has moved to the rising limit (backward limit). Here, assume that a length in the up-down direction (front-back direction) from the root side end portion of the reinforcing rib 10g (coupling portion between the reinforcing rib 10g and the top wall 10a) to a tip side end portion 12h of the extension portion 12e is L. In addition, a length (indicated by the solid line in Fig. 4) in the front-back direction from the root side end portion of the reinforcing rib 10g (coupling portion between the reinforcing

rib 10g and the top wall 10a) to the tip side end portion 10p of the rib root portion 10j in a state where the cap 10 and the head 12 are not combined and the elastic pieces 10e and the extension portion 12e are not in contact with each other is L1. Here, it has been recognized that setting the elastic pieces 10e and the extension portion 12e as in the following formula (1) is effective in reducing the influence of decrease of elasticity.

$$0.3 \times L \leq L1 \leq 0.6 \times L \dots (1)$$

In the present embodiment, $L1 = 0.4 \times L$, and it has been recognized that this setting is particularly effective in reducing the decrease in elasticity.

[0042] As illustrated in Fig. 6, it has been recognized that it is effective in reducing the influence of decrease of elasticity to locate the tip side end portion 10p of the rib root portion 10j at the same position in the front-back direction as the contact portion 12f between the extension portion 12e and the elastic piece 10e or locate the tip side end portion 10p of the rib root portion 10j on the root side of the reinforcing rib 10g relative to the contact portion 12f (lower side relative to the contact portion 12f) in a state where the head 12 has moved to a lowering limit (forward limit).

[0043] Although an embodiment of the present invention has been described above, the present invention is not limited to such a specific embodiment, and various modifications and changes may be made without departing from the spirit and scope of the present invention as set forth in the claims, unless otherwise specified in the above description. For example, addition and deletion can be made to the constituent elements of the above embodiment as appropriate, and a constituent element of one embodiment may be provided in another embodiment. In addition, the effects of the above embodiment are merely examples of the effects produced by the present invention, and it is not intended that the effects of the present invention are limited to the above effects.

[0044] For example, the pump described above is an example, and a case where another type of pump is adopted is also included in the present invention. In addition, the number of elastic pieces 10e and the positions where the elastic pieces 10e are provided are not limited to those in the above embodiment, and can be appropriately changed. In addition, the number of reinforcing ribs 10g and the positions where the reinforcing ribs 10g are provided are not limited to those in the above embodiment, and can be appropriately changed. Further, the reinforcing rib 10g may be configured such that the tip side end portion 10p of the rib root portion 10j is connected to the inner circumferential surface of the elastic piece main body 10f without providing the rib tip portion 10m. The outer circumferential surface of the elastic piece main body 10f is not limited to the one having an arc shape in plan view as in the present embodiment, and may be one that has a linear shape

in plan view, for example. The extension portion 12e is not limited to the one having a cylindrical shape, and may be, for example, one having a rectangular cylindrical shape.

[0045] In addition, the elastic pieces 10e of the present embodiment are bent toward the central axis O, but may be bent away from the central axis O. Although the cap 10 is provided with the elastic pieces 10e and the head 12 is provided with the extension portion 12e in the present embodiment, the cap 10 may be provided with the extension portion 12e and the head 12 may be provided with the elastic pieces 10e.

Reference Signs List

[0046]

1	cylinder
1a	bottom wall portion
1b	cylindrical wall portion
1c	flange wall
1d	suction port
1e	holding cylinder
1f	ventilation port
2	valve member
2a	base portion
2b	valve body portion
2c	coupling piece
4	pipe
5	inner member
5a	coupling cylinder
5b	bottom portion
5c	communication port
5d	annular portion
6	piston
6a	base portion
6b	outer sliding piece
6c	inner sliding piece
7	cylindrical member
7a	stem
7b	enlarged diameter portion
8	holder
8a	holder base portion
8b	flange
9	packing
10	cap
10a	top wall
10b	circumferential wall
10c	female screw portion
10d	rotation preventing recess
10e	elastic piece
10f	elastic piece main body
10g	reinforcing rib
10h	arc-shaped outer circumferential portion
10j	rib root portion
10k	rib gradually changing portion
10m	rib tip portion
10n	root side end portion of reinforcing rib

10p tip side end portion of rib root portion
 10q tip side end portion of rib gradually changing portion
 10r tip side end portion of rib tip portion
 10s tip side end portion of reinforcing rib
 11 cover
 11a cover circumferential wall
 11b retaining projection
 11c rib
 11d inward flange
 12 head
 12a cylindrical portion
 12b top portion
 12c nozzle
 12d discharge port
 12e extension portion
 12f contact portion
 12g arc-shaped inner circumferential portion
 12h tip side end portion
 100 pump-type dispenser
 O central axis

Claims

1. A pump-type dispenser comprising:
 - a cap attached to a mouth of a container that stores a content liquid;
 - a pump that is held at the mouth by the cap and is driven by forward and backward movement of a stem; and
 - a head that has a discharge port for discharging the content liquid to an outside and is coupled to the stem, wherein the content liquid in the container is discharged through the discharge port by moving the head toward the cap,
 - one of the head and the cap is provided with an extension portion extending toward the other of the head and the cap,
 - the other of the head and the cap is provided with an elastic piece that is bent by the extension portion when the head is moved forward toward the cap,
 - the elastic piece includes an elastic piece main body and a reinforcing rib that is narrower than the elastic piece main body, and
 - the reinforcing rib includes a rib root portion located on a root side of the reinforcing rib and a rib gradually changing portion whose thickness gradually decreases from the rib root portion toward a tip side of the reinforcing rib.
2. The pump-type dispenser according to claim 1, wherein
 - in a state where the head has moved to a forward limit, a tip side end portion of the rib root portion is located at a same position in a front-back direction

as a contact portion of the extension portion with the elastic piece or located on a root side of the reinforcing rib relative to the contact portion.

3. The pump-type dispenser according to claim 1, wherein
 - when a length in the front-back direction from a root side end portion of the reinforcing rib to a tip side end portion of the extension portion in a state where the head has moved to a backward limit is L, and a length in the front-back direction from the root side end portion of the reinforcing rib to a tip side end portion of the rib root portion in a state where the head and the cap are not combined and the elastic piece and the extension portion are not in contact with each other is L1, the following formula (1) is satisfied:

$$0.3 \times L \leq L1 \leq 0.6 \times L \dots (1)$$

4. The pump-type dispenser according to claim 1, wherein

the extension portion includes an arc-shaped inner circumferential portion that comes into contact with the elastic piece to bend the elastic piece,
 the elastic piece includes an arc-shaped outer circumferential portion with which the arc-shaped inner circumferential portion comes into contact, and
 a radius of curvature of the arc-shaped outer circumferential portion is smaller than a radius of curvature of the arc-shaped inner circumferential portion.

FIG. 1

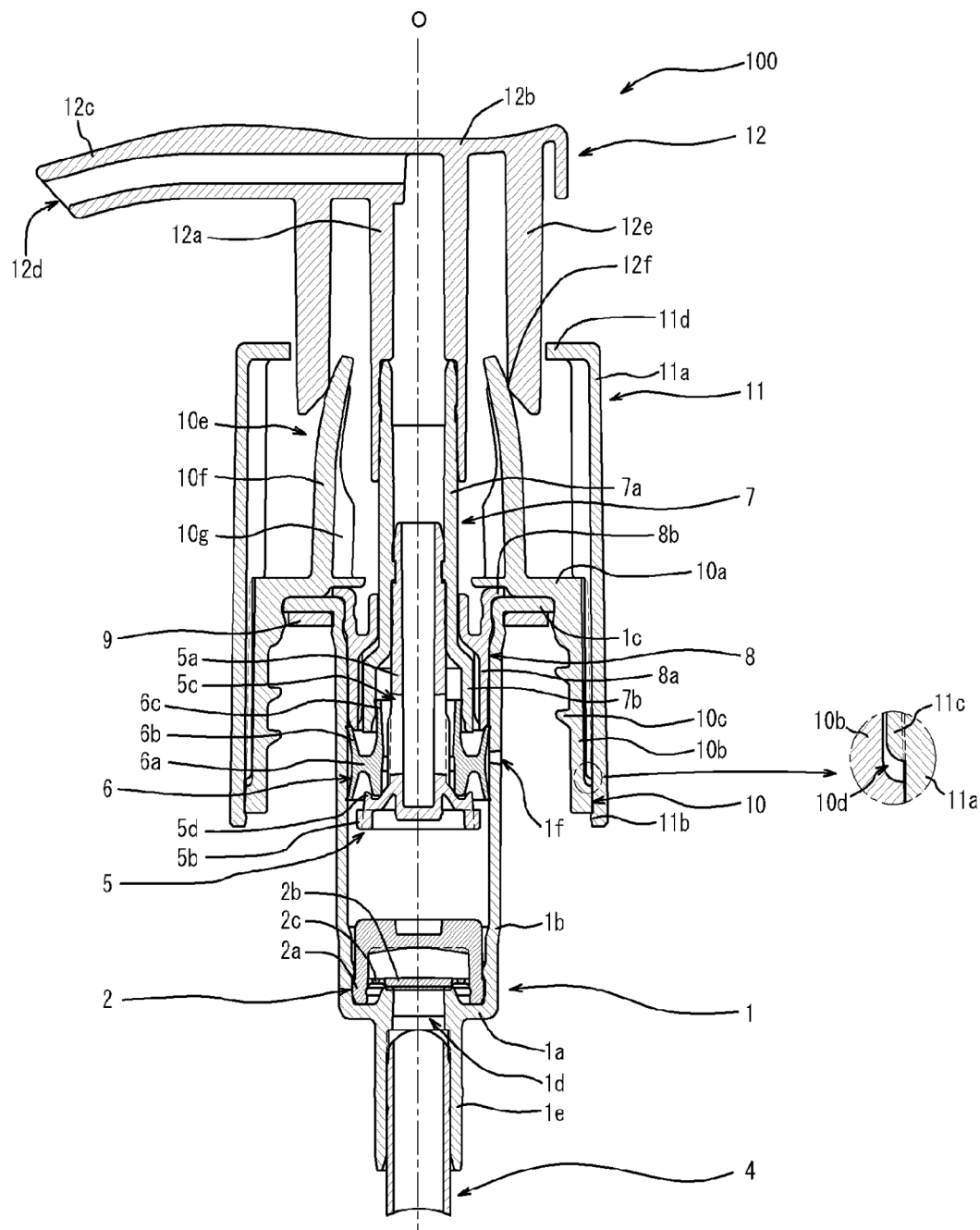


FIG. 2

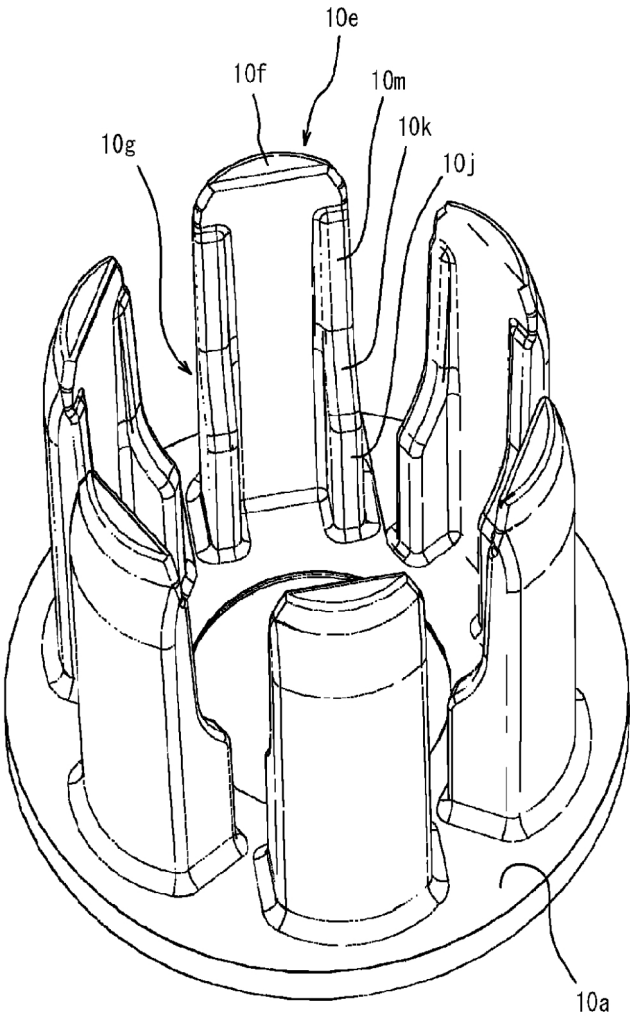


FIG. 3

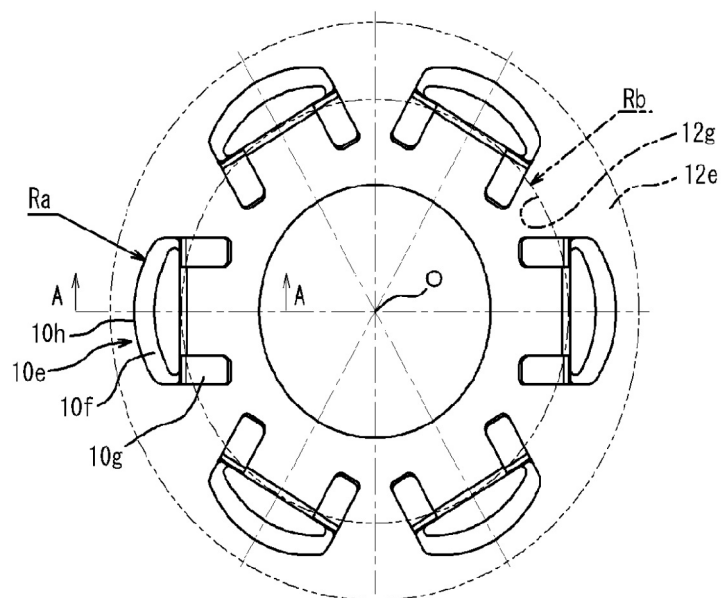


FIG. 4

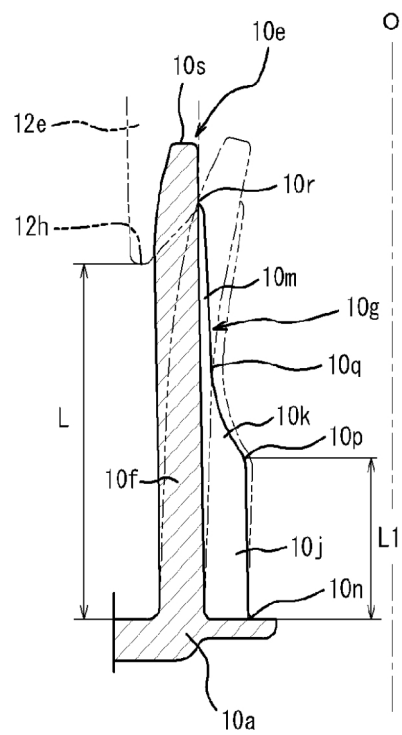


FIG. 5

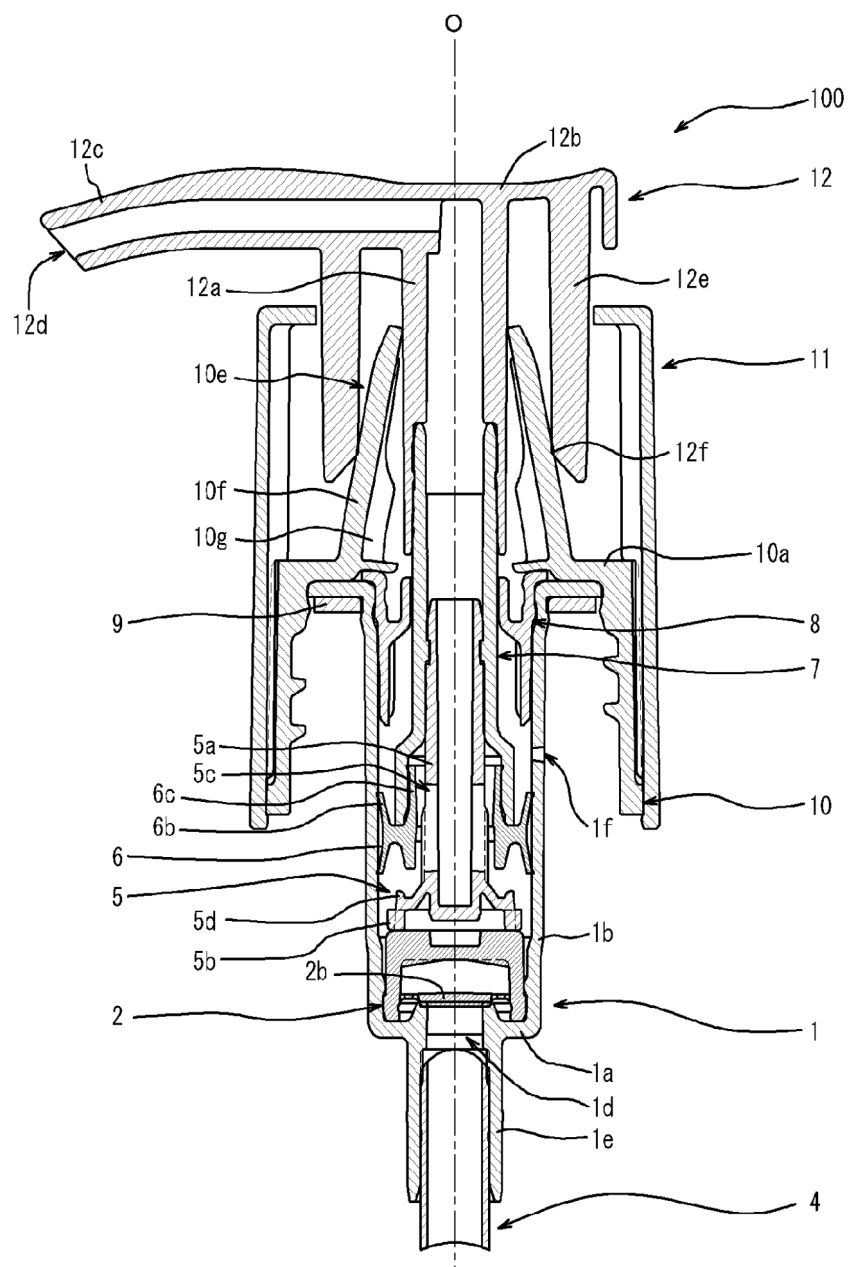
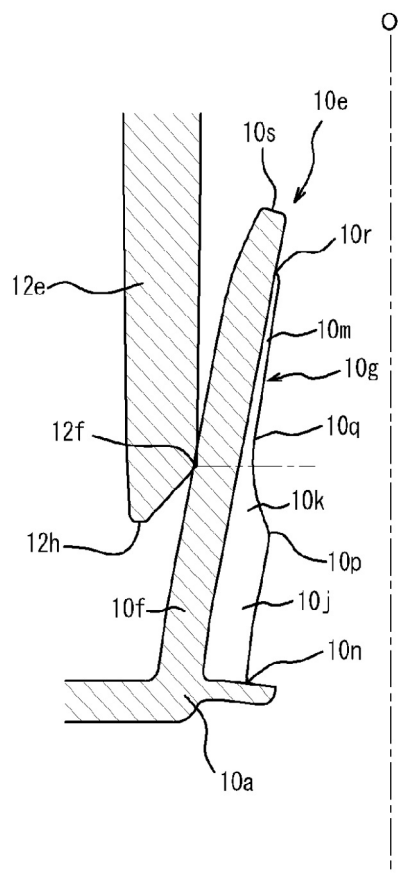


FIG. 6



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2024/038586

A. CLASSIFICATION OF SUBJECT MATTER

B65D 47/34(2006.01)i
FI: B65D47/34 110

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)
B65D47/34

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

Published examined utility model applications of Japan 1922-1996
Published unexamined utility model applications of Japan 1971-2024
Registered utility model specifications of Japan 1996-2024
Published registered utility model applications of Japan 1994-2024

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.
Y	JP 2002-096858 A (SHISEIDO COMPANY, LTD.) 02 April 2002 (2002-04-02) paragraphs [0007]-[0011], fig. 1-2	1-4
Y	JP 2021-183502 A (YOSHINO KOGYOSHO CO., LTD.) 02 December 2021 (2021-12-02) paragraphs [0014]-[0042], fig. 1-5	1-3
Y	JP 2015-128656 A (KABUSHIKI KAISHA NITOMS) 16 July 2015 (2015-07-16) paragraphs [0046]-[0047], [0051], fig. 6, 9	1-4
A	JP 2000-354803 A (TOYO SEIKAN KAISHA LTD.) 26 December 2000 (2000-12-26)	1-4
A	JP 10-059404 A (YOSHINO KOGYOSHO CO., LTD.) 03 March 1998 (1998-03-03)	1-4

☐ 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

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Name and mailing address of the ISA/JP

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Authorized officer

Telephone No.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/JP2024/038586

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
JP	2002-096858	A	02 April 2002	(Family: none)	
JP	2021-183502	A	02 December 2021	(Family: none)	
JP	2015-128656	A	16 July 2015	(Family: none)	
JP	2000-354803	A	26 December 2000	(Family: none)	
JP	10-059404	A	03 March 1998	(Family: none)	

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2011031950 A [0004]