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(54) **Dispensing system**

Abgabesysteme

Système de distribution

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Description

[0001] These proposals have to do with dispensing systems including a dispenser pump having a tube extending down to the bottom of a container of flowable material to be dispensed. A reciprocating plunger action of the dispenser pump draws the material up through the tube into the pump chamber at the top of the container and thence through the pump outlet, typically a spout or nozzle.

[0002] Dispensing systems of this general type are well known. The present proposals are concerned with systems of a special type (referred to below as "the type described")in which a follower plate is provided fitting axially slidably around the tube. This follower plate lies on top of the product mass and follows it down the container as dispensing proceeds to assure complete clearance of the contents. The arrangement is particularly useful with thick and viscous products. Our EP-A-765690 gives further background and describes a refinement of the feed tube installation for improving reliability.

[0003] The invention is defined by the features of claim 1, i.e. what we now propose is that the system is made with an integrated axially-extending body tube component whose outer surface acts as guide for the follower-plate and whose lower region acts as a feed tube as aforesaid. The distinctive feature is that an upper part of the body tube component constitutes the pump chamber wall which defines the pump chamber, and where the inner surface of said tube, within said pump chamber, directly confronts and/or co-operates with the reciprocating plunger of the pump, e.g. with a seal against a piston thereof.

[0004] Previous constructions provided a self-contained pump unit with a pump body over which a discrete feed tube was fitted in the conventional way. Our proposal above enables substantial simplification of this, with reduction in the number of components and amount of structural material required.

[0005] The body tube component may have one or more integral interior projections at the bottom of its upper part, for an inlet valve arrangement such as a ball or flap valve. The projection(s) may support the inlet valve arrangement and/or provide a sealing surface for it. An annular flange may be used, and can be shaped in accordance with the type of valve. For example it may be flat, downwardly-convergent or a combination of these. This or other projection(s) of the body tube interior may provide a reaction abutment for a pump plunger return spring, where this is provided inside the pump chamber.

[0006] The body tube component's outer surface is preferably of uniform cross-section, e.g. cylindrical, over substantially its entire length. This enables a full range of axial travel for the follower plate. The lower end of the body tube preferably extends to the bottom of the container, and may engage it with a mechanical interlock to inhibit lateral movement as in our EP-A-765690. The upper part of the body tube (providing the pump chamber wall) preferably extends up at least as far as a top cover of the container. The body tube may conveniently be located by a fixing extending through a hole in the top cover. In particular the top end of the body tube may be provided with securing formations, such as a thread or snap projections, engageable with a complementary securing component which is part of or is on the other side of the top cover to hold the body tube in position. A preferred arrangement has the top of the body tube formed with an upwardly-directed reaction surface, e.g. on one or more outward flanges, to bear upwardly against the top cover. The securing portion of the body tube, such as a threaded or ribbed tubular extension thereof, projects above the reaction surface(s) to fit through a hole in the top cover and engage a complementary securing component which bears against the top cover from above. This complementary securing component may include a pump body sleeve serving as a guide for the pump plunger.

[0007] One or more vent openings can be provided through the body tube wall to allow air to permeate into the container through the pump after dispensing, compensating for the volume of dispensed product. Such a vent opening is preferably provided immediately below the top cover of the container.

[0008] We particularly prefer to use a body tube whose major part residing inside the container is a cylindrical tube of generally uniform exterior profile; furthermore its interior surfaces are preferably uniformly cylindrical (except for any inlet valve supports as mentioned above) although the pump chamber interior at the upper part may differ in diameter from the feed tube interior at the lower part.

[0009] Another preferred feature (also proposed herein as an independent aspect in a dispensing system of the type described) is that the central opening of the follower plate through which the feed tube passes, has a downwardly convergent guide region at its top part. This is to facilitate insertion of the body tube down through the follower plate from above, since it is convenient to assemble the body tube and other pump components before insertion into the follower plate and container. This is particularly relevant with high-efficiency follower plates having resilient sealing lips engaging the container and body tube walls. These need to incline towards the container/body tube surfaces for effective sealing. Insertion of the body tube from above is then problematic. In our new proposal, both functions are achieved by the follower plate's central opening having a sealing lip having a downwardly-convergent portion immediately around the opening, linked to an upwardly extending portion on the main web of the follower plate.

[0010] The dispenser pump itself desirably has a piston with an outwardly-directed seal engaging against the interior surface of the upper part of the body tube component. However other sealing/displacement ar-

rangements are possible provided that the body tube interior confronts the plunger. The outlet conduit of the pump typically extends up within the plunger, preferably via a unidirectional discharge valve, to an outlet which may move with the plunger and is typically a spout or nozzle integral with or fitted on the plunger component.

[0011] A return spring for the plunger may be provided in the pump chamber, e.g. acting between the plunger and interior projection on the body tube component as mentioned above, or outside the pump chamber e.g. acting between the plunger component and an upper pump body part such as a securing component which holds the body tube to a container cover cap.

[0012] A discharge valve can be provided within the discharge conduit of the plunger component, e.g. a trapped ball valve as seen in our earlier application. However a novel proposal herein, useful for high-efficiency dispensing of high-viscosity product (especially in conjunction with a follower plate using sealing lips as referred to above) is to use a flap valve of resilient material in the plunger's discharge conduit. A preferred construction has a flap of resilient valve material trapped in the discharge conduit by an interfitting rigid insert which holds the flexible flap element in place and provides a sealing surface for it. The rigid insert defines discharge openings underlying the web of the flap and therefore covered in the flap's rest condition. The flap provides an opening normally blocked by a solid part of the insert so that passage of material through the valve is only possible when pressure forces the resilient flap away from the insert. Such a construction can advantageously be fitted into a socket formation at the lower end of the plunger e.g. inside the piston element thereof. This proposal of a resistant flap discharge valve is both a preferred feature in conjunction with the first aspect of the invention proposed herein and also an independent proposal in a dispensing system of the type described.

[0013] The pump assembly without the container, with or without a container cover, is an independent aspect of the invention which may or may not include the follower plate too.

[0014] Examples embodying these proposals are now described with reference to the accompanying drawings, in which

Fig. 1 shows a first dispensing system in axial cross-section, and

Fig. 2 shows a similar cross-section of a second embodiment which is a high-efficiency system with close sealing.

[0015] A container 1 for material to be dispensed (not shown) has a cylindrical side wall 12 and a generally flat base 11. The top opening of the container is closed by a top cover 2 having a downward peripheral skirt 23 with internal circumferential ribs 24 making a secure and air-tight snap engagement over corresponding outwardly directed ribs 14 around the top of the container wall.

[0016] The top cover 2 has a flat horizontal main web 21 with a central circular opening 22 through which a pump arrangement 10 is mounted as described below. Note also a tamper-evident strip 25 secured around the bottom edge of the cover's skirt 23 by a thin join, and which is caught under a bead on the container wall 12 so that the strip 25 must be pulled off for the cover 2 to be removed.

[0017] It will be appreciated that the manner in which the cap 2 fits onto the container 1 is not critical and may be varied as desired.

[0018] A stiff cylindrical body tube 3 extends vertically from the bottom of the container, where it rests on the base 11, up to the central opening 22 of the cover 2. An integral tubular threaded extension 33 of the body tube 3 projects up through this opening 22 and is held in place there by engagement with the threaded downward skirt 61 of a fixing collar and plunger guide component 6. An integral annular flange 34 projects out radially from the body tube 3 immediately below the threaded top extension 33 and the cover cap web 21 is trapped between this and the securing component's downward skirt 61 for a secure location.

[0019] The foot 37 of the body tube 3 rests against the centre of the container base 11, as mentioned above, and has sideways openings 38 so that material from the container can enter the tube 3 at the foot. In the Fig. 1 embodiment the container base 11 is essentially plain. The Fig. 2 embodiment shows an improvement in which the foot 37 of the tube interlocks with an upstanding cruciform spike 13 formed integrally with the container base, and which prevents any slight sideways movements of the tube foot.

[0020] The outer surface 36 of the body tube 3 is a uniform smooth cylinder from the top to the bottom of the container, and serves as an inner guide for a follower plate 5. The follower plate 5 is generally a flat annular plate with a central opening 52 through which the body tube 3 passes, and extends out radially from the central opening to span the gap between the tube 3 and the container side wall 12. Its function, as known from earlier disclosures, is to lie on top of the mass of product in the container. As the product is dispensed and its level in the container falls, the follower plate 5 moves down the container guided by the tube 3 to assure full clearance of the container space and also to prevent voids from forming in the material during dispensing.

[0021] The body tube 3 provides plural functions in the container. It guides the follower plate 5 as mentioned. Its lower part 32 acts as a feed tube by which material entering through its foot is fed to the pump mounted at the top of the container. Its upper portion 31 acts as a wall of the pump chamber 66 in which the pump piston 73 operates. The upper and lower portions 31,32 of the tube are demarcated by an internal valve support arrangement for providing an inlet valve through which material from the feed tube portion 32 can enter the pump chamber 66 defined within the upper portion 31

of the tube.

[0022] Reference is now made particularly to the embodiment of Fig. 1. Here the valve arrangement 4 is provided by an integrally-moulded projection of the body tube 3, including a radially inward flat annular flange 41 acting as abutment for a pump spring 65, and leading to a central downward convergent portion 42 acting as a sealing seat for a valve ball 43. The valve ball 43 can move up to let material into the pump chamber 66, but its escape is prevented by a central projection of the pump spring 65.

[0023] Turning to the embodiment of Fig. 2, here the inlet valve 4 is supported on a flat annular inward flange 44 formed integrally on the body tube 3 to define a central circular opening. A discrete flap valve insert 45 has an outer mounting annulus 46 which rests on the body tube flange 44, and a central flexibly-linked flap 47 which lies over the central opening to act as a valve in a subevident fashion.

[0024] The pump construction at the top of the container includes the fixing collar component 6 already referred to, which also has a central sleeve 63 guiding the movement of a pump plunger shaft 71. The bottom end of this plunger shaft 71 is formed with a piston 73 which seals outwardly against the inner surface of the upper portion 31 of the body tube 3. In the Fig. 1 embodiment this seal is a double-acting flared seal 74 formed integrally with the shaft and piston component. In the Fig. 2 embodiment, where higher-efficiency sealing is called for, the piston seal uses an O-ring 75 seated in a groove around the piston.

[0025] A central discharge channel 72 extends up inside the plunger shaft 71.

[0026] A plunger head 8 is fitted to the top of the plunger shaft 71 by a snap fitting 81 and includes a laterally-directed discharge nozzle or spout 82 with an internal nozzle channel 87 communicating with the discharge channel 72 of the plunger shaft 71.

[0027] A discharge valve 9, described in more detail below, is installed in the discharge channel and acts to prevent air or dispensed material from flowing back from the nozzle towards the pump chamber 66.

[0028] The general operation of the pump is now easily appreciated. Upward movement of the plunger shaft 71 opens the inlet valve 4 and draws material into the pump chamber 66 via the feed tube portion 32 of the body tube 3. Closure of the discharge valve 9 supports this action. Subsequent depression of the plunger head moves the piston 73 down into the pump chamber 66, the inlet valve 4 shuts and the material is forced up through the discharge channel 72 and out of the nozzle 82 via the discharge valve 9.

[0029] A pump spring 65 acts in a conventional manner to urge the plunger to the raised position. Fig. 1's embodiment has the pump spring 65 in the pump chamber 66, acting between the inward flange 41 of the body tube adjacent the inlet valve at the lower end and against an internal shoulder of the plunger shaft 71 at the upper end. Fig. 2's embodiment has the return spring 65 outside the pump chamber 66. This may be desirable e.g. where metal components must not contact the material to be dispensed. In the Fig. 2 embodiment the fixing collar 6 has an upward tubular extension 64 fitting into a complementary downward tubular extension 86 of the plunger head 8. These nested tubular components enshroud the spring in an annular space around the plunger shaft 71, with its lower end acting against the fixing collar component 6 and its upper end against the plunger head 8.

[0030] It is necessary for air to be able to enter the container in a leak-safe fashion to compensate for the volume of product dispensed. In the present arrangement sufficient air can leak between the plunger shaft 71 and its guide sleeve 63, entering the container interior through one or more small vent openings 35 through the body tube wall immediately below its locating flange 34.

[0031] It will be clear from the above description that the construction of the body tube 3 brings a substantial simplification of construction and saving in material. Previous constructions required the step of fitting the feed tube to the body, and extra material was used because the feed tube had to fit right up around the pump body in order to guide the follower plate smoothly. Furthermore the present arrangement enables the pump inlet valve to be supported by integral formations of the body tube interior. Finally the top extension 33 of the body tube, another integral portion, serves for securing the tube in place relative to the top cover 2, and in Authorised Representative manner analogous to that known for securing a pump body in place so there are no added complications.

[0032] As already mentioned the embodiment of Fig. 2 is particularly concerned to provide high efficiency sealing and valving suitable for use with products of high thickness or high viscosity. Details of these features and the corresponding features of Fig. 1 are now discussed.

[0033] Firstly, as regards the discharge valve 9 Fig. 1's embodiment uses a known construction with a ball valve. The top opening of the plunger shaft 71 has a downwardly-convergent valve seat 91 and the ball 92 of the valve is trapped in this when the plunger head 8 is fitted.

[0034] By contrast, Fig. 2's embodiment uses a flexible rubber disc 96 with a central hole, trapped in the bottom opening of the discharge channel 72 by a stiff insert component 93 which snaps into the piston of the plunger shaft 71. Note that from the point of view of valve function these components could be anywhere in the discharge channel, but from the point of view of installation it is easier to fit the insert at the entrance to the discharge channel. It also minimises unswept volume in the pump. The insert 93 has a central upwardly-directed land 95 and off-centre openings 94, so that in the rest condition the flexible rubber disc seals against the land and shuts the openings 94. When pressure in the pump chamber

66 rises to a sufficient level it raises the edge of the rubber disc so that material can flow from the openings 94 to the disc opening 95 and out.

[0035] Further refinements relate to the follower plate 5. The Fig. 1 embodiment uses a simple stiff follower plate which makes a snug but not sealing fit around the body tube 3, and whose outer edge 53 reaches substantially to the container wall 12 but does not seal flexibly against it. By contrast the Fig. 2 embodiment has a follower plate making a close seal against the body tube 3 and container wall 12, by means of axially directed relatively flexible sealing lips 59, 58 at its outer and inner peripheries. This in itself is known - see our EP-A-765690. However with the one-piece body tube used in the present systems it is best to assemble the follower plate 5 onto the tube 3 after the tube 3 has been fitted to the cover cap 2 and other pump components. The tube 3 is inserted into the follower plate from above after having laid the follower plate on the surface of the product, to avoid trapping air between plate and product. So, we use a downward convergence of the follower plate construction around its central opening 52. In the Fig. 1 embodiment this is a tapered interior zone 55 at the top of its central upstanding stiff collar 54. In the Fig. 2 version, the flexible sealing lip 58 to seal against the body tube 3 is made downwardly convergent, but extends down from the top of a reinforced upward wall portion 57 so that it does not project below the web level of the follower plate and prevent eventual clearance of the container.

[0036] A final point of note is that it is desirable to block the discharge nozzle e.g. during transport, storage or other periods of non-use. Fig. 1 shows a closure 83 including both an intruding plug and a surrounding cap for the nozzle 82. A refinement is involved in linking this plug/cap 83 by an integral flexible link 84 to a removable security collar 85 which fits around the plunger shaft 71 to prevent inadvertent or undesired depression of the plunger head 8. Forming these two components in one piece with a flexible link between can reduce cost as well as being practically convenient as a means of avoiding loss of the components, and is a independent aspect of the present proposals in a dispensing system of the type described, as well as a preferred feature in relation to other independent aspects disclosed here.

Claims

1. A dispensing system comprising

a container (1) for holding a flowable material to be dispensed;
a follower plate (5) to lie on top of the material in the container (1) and move down the container as the material is dispensed, and
a dispenser pump arrangement (10) including a piston (73) reciprocable in a pump chamber (66) adjacent to the top of the container (1) to dispense material from the container (1) in cooperation with an inlet valve (4), and a tube (3) extending down through a central opening (52) of the follower plate (5) and having an outer surface (31) with which the follower plate (5) engages slidably so that the tube (3) guides the movement of the follower plate (5) down the container (1), a lower region (32) of the tube (3) providing a feed tube for flow of material to the pump chamber (66),

characterised in that,

an upper region (31) of the tube (3) constitutes the pump chamber wall which defines the pump chamber (66), and where the inner surface of said tube (3), within said pump chamber (66), directly confronts and/or cooperates with the reciprocable piston (73).

2. A dispensing system according to claim 1 in which the container (1) has a removable top cover (2) with a central hole (22), and the top end of the tube (3) has an integral securing formation (33) engaging a complementary securing component (6) on or above the cover (2) to mount the tube (3) to the cover.

3. A dispensing system according to claim 2 in which the securing formation is an integral threaded extension (33) of the tube (3) which projects up through the hole (22) in the cover (2).

4. A dispensing system according to any one of the preceding claims in which the tube (3) has one or more integral interior projections (41,42,44) for an inlet valve arrangement at the bottom of the upper region (31) thereof.

5. A dispensing system according to claim 4 in which said one or more integral interior projections (41,42,44) support the inlet valve arrangement.

6. A dispensing system according to claim 4 or claim 5 in which said one or more integral interior projections (41,42,44) provide a sealing surface for a moveable valve element (43,47) of the inlet valve arrangement.

7. A dispensing system according to any one of claims 4 to 6 in which a, said integral interior projection comprises an annular flange (41,44).

8. A dispensing system according to any one of claims 4 to 7 in which said one or more integral interior projections (41) of the tube (3) provide a reaction abutment for a pump plunger return spring (65) in the pump chamber (66).

9. A dispensing system according to any one of claims 1 to 3 in which the tube (3) has one or more integral interior projections (41,44) providing a reaction abutment for a pump plunger return spring (65) in the pump chamber.

10. A dispensing system according to any one of the preceding claims in which the outer surface (36) of the tube (3) is uniformly cylindrical over the transition from the lower region (32) providing the feed tube to the upper region (31) which is the pump chamber wall.

11. A dispensing system according to any one of the preceding claims in which the piston (73) makes a sealing engagement against said inner surface of the pump chamber wall provided by the upper region (31) of the tube (3).

12. A dispensing system according to any one of the preceding claims in which the lower end of the tube (3) engages the bottom of the container (1).

13. A dispensing system according to any one of the preceding claims in which the upper end of the tube (3) has one or more vent openings (35) through its wall to permit air to flow into the container through the pump arrangement and compensate the volume of dispensed material.

14. A dispensing system according to any one of the preceding claims in which the follower plate (5) has a downwardly-convergent guide surface around its central opening (52) to facilitate entry of the tube (3) into that opening from above.

Patentansprüche

1. Abgabesystem, umfassend

einen Behälter (1) zur Aufnahme eines zur Abgabe vorgesehenen fließfähigen Materials;

eine Folgerplatte (5), die auf der Oberfläche des Materials im Behälter (1) zu liegen kommt und sich den Behälter hinunter bewegt, während das Material abgegeben wird, und

eine Abgabepumpenanordnung (10), die einen Kolben (73) umfasst, der in einer Pumpenkammer (66) nahe der Oberseite des Behälters (1) hin- und herbewegbar ist, um Material aus dem Behälter (1) in Kooperation mit einem Einlassventil (4) abzugeben, sowie ein Rohr (3), das sich durch eine zentrale Öffnung (52) der Folgerplatte (5) hinunter erstreckt und eine Außenfläche (31) aufweist, mit der sich die Folgerplatte (5) in Gleiteingriff befindet, so dass das Rohr (3) die Bewegung der Folgerplatte (5) den Behälter (1) hinunter führt, wobei ein unterer Bereich (32) des Rohres (3) ein Zufuhrrohr für das Fließen von Material zur Pumpenkammer (66) bereitstellt,

dadurch gekennzeichnet, dass ein oberer Bereich (31) des Rohres (3) die Pumpenkammerwand bildet, die die Pumpenkammer (66) definiert, und wo die Innenfläche des Rohres (3) innerhalb der Pumpenkammer (66) dem hin- und herbeweglichen Kolben (73) direkt gegenübersteht und/oder damit zusammenwirkt.

2. Abgabesystem nach Anspruch 1, bei dem der Behälter (1) eine abnehmbare obere Abdeckung (2) mit einem Mittelloch (22) aufweist und das obere Ende des Rohres (3) eine einstückige Befestigungsausbildung (33) aufweist, die mit einer komplementären Befestigungskomponente (6) auf oder über der Abdeckung (2) ineinandergreift, um das Rohr (3) auf der Abdeckung zu montieren.

3. Abgabesystem nach Anspruch 2, bei dem die Befestigungsausbildung ein einstückiger Gewindefortsatz (33) des Rohres (3) ist, der durch das Loch (22) in der Abdeckung (2) nach oben ragt.

4. Abgabesystem nach einem der vorangegangenen Ansprüche, bei dem das Rohr (3) einen oder mehrere einstückige Vorsprünge (41, 42, 44) für eine Einlassventilanordnung am unteren Ende seines oberen Bereichs (31) aufweist.

5. Abgabesystem nach Anspruch 4, bei dem der eine oder die mehreren einstückigen inneren Vorsprünge (41, 42, 44) die Einlassventilanordnung tragen.

6. Abgabesystem nach Anspruch 4 oder 5, bei dem der eine oder die mehreren einstückigen inneren Vorsprünge (41, 42, 44) eine Dichtungsfläche für ein bewegliches Ventilelement (43, 47) der Einlassventilanordnung bereitstellen.

7. Abgabesystem nach einem der Ansprüche 4 bis 6, bei dem ein solcher einstückiger innerer Vorsprung einen ringförmigen Flansch (41, 44) umfasst.

8. Abgabesystem nach einem der Ansprüche 4 bis 7, bei dem der eine oder die mehreren einstückigen inneren Vorsprünge (41) des Rohres (3) ein Gegenkraftwiderlager für eine Pumpenkolben-Rückstellfeder (65) in der Pumpenkammer (66) bereitstellen.

9. Abgabesystem nach einem der Ansprüche 1 bis 3, bei dem das Rohr (3) einen oder mehrere einstükkige innere Vorsprünge (41, 44) aufweist, die ein

Gegenkraftwiderlager für eine Pumpenkolben-Rückstellfeder (65) in der Pumpenkammer bereitstellen.

10. Abgabesystem nach einem der vorangegangenen Ansprüche, bei dem die Außenfläche (36) des Rohres (3) über den Übergang vom unteren Bereich (32), der das Zufuhrrohr bereitstellt, zum oberen Bereich (31), der die Pumpenkammerwand darstellt, gleichmäßig zylindrisch ist.

11. Abgabesystem nach einem der vorangegangenen Ansprüche, bei dem der Kolben (73) einen Dichtungseingriff gegen die Innenfläche der Pumpenkammerwand herstellt, die vom oberen Bereich (31) des Rohres (3) bereitgestellt wird.

12. Abgabesystem nach einem der vorangegangenen Ansprüche, bei dem das untere Ende des Rohres (3) mit dem Boden des Behälters (1) ineinandergreift.

13. Abgabesystem nach einem der vorangegangenen Ansprüche, bei dem das obere Ende des Rohres (3) eine oder mehrere Entlüftungsöffnungen (35) durch seine Wand aufweist, um das Einströmen von Luft in den Behälter durch die Pumpenanordnung zuzulassen und das Volumen des abgegebenen Materials zu ersetzen.

14. Abgabesystem nach einem der vorangegangenen Ansprüche, bei dem die Folgerplatte (5) eine nach unten zulaufende Führungsfläche um ihre Mittelöffnung (52) herum aufweist, um das Eintreten des Rohres (3) in diese Öffnung von oben zu erleichtern.

Revendications

1. Système de distribution comprenant

un récipient (1) pour un matériau coulant à distribuer;
une plaque suiveuse (5) pour reposer sur le sommet du matériau dans le récipient (1) et pour descendre le récipient lorsque le matériau est distribué et
un agencement de pompe de distribution (10) incluant un piston (73) apte à effectuer un mouvement de va-et-vient dans une chambre de pompe (66) adjacente au sommet du récipient (1) pour distribuer le matériau du récipient (1) en coopération avec une vanne d'entrée (4), et un tube (3) s'étendant vers le bas à travers une ouverture centrale (52) de la plaque suiveuse (5) et ayant une surface extérieure (31) avec laquelle la plaque suiveuse (5) vient en prise de coulissement de telle sorte que le tube (3) guide le mouvement de descente de la plaque suiveuse (5) dans le récipient (1), une région inférieure (32) du tube (3) constituant un tube d'amenée pour l'écoulement du matériau à la chambre de pompe (66),

caractérisé en ce que
une région supérieure (31) du tube (3) constitue la paroi de chambre de pompe qui définit la chambre de pompe (66), et où la surface intérieure dudit tube (3), dans ladite chambre de pompe (66), est directement confrontée à et/ou coopère avec le piston de va-et-vient (73).

2. Système de distribution selon la revendication 1, où le récipient (1) a un couvercle supérieur amovible (2) avec un trou central (22), et l'extrémité supérieure du tube (3) comporte une formation de fixation intégrale (33) venant en prise avec un composant de fixation complémentaire (6) sur ou au-dessus du couvercle (2) pour monter le tube (3) sur le couvercle.

3. Système de distribution selon la revendication 2, où la formation de fixation est une extension filetée intégrale (33) du tube (3) qui dépasse à travers le trou (22) dans le couvercle (2).

4. Système de distribution selon l'une des revendications précédentes, où le tube (3) a une ou plusieurs saillies intérieures intégrales (41, 42, 44) pour un agencement de vanne d'entrée au fond de la région supérieure (31) de celui-ci.

5. Système de distribution selon la revendication 4, où une ou plusieurs saillies intérieures intégrales précitées (41, 42, 44) supporte l'agencement de vanne d'entrée.

6. Système de distribution selon la revendication 4 ou la revendication 5, dans lequel une ou plusieurs saillies intérieures intégrales précitées (41, 42, 44) réalisent une surface d'étanchéité pour un élément de vanne mobile (43, 47) de l'agencement de vanne d'entrée.

7. Système de distribution selon l'une des revendications 4 à 6, dans lequel une saillie intérieure intégrale comprend un rebord annulaire (41, 44).

8. Système de distribution selon l'une des revendications 4 à 7, dans lequel une ou plusieurs saillies intérieures intégrales (41) du tube (3) réalisent une butée de réaction pour un ressort de rappel de plongeur de pompe (65) dans la chambre de pompe (66).

9. Système de distribution selon l'une des revendications 1 à 3, dans lequel le tube (3) comprend une ou plusieurs saillies intérieures intégrales (41, 42) constituant une butée de réaction pour un ressort de rappel de plongeur de pompe (65) dans la chambre de pompe.

10. Système de distribution selon l'une des revendications précédentes, où la surface extérieure (36) du tube (3) est uniformément cylindrique sur la transition de la région inférieure (32) constituant le tube d'amenée à la région supérieure (31) qui est la paroi de la chambre de pompe.

11. Système de distribution selon l'une des revendications précédentes, dans lequel le piston (73) vient en prise étanche avec ladite surface intérieure de la paroi de chambre de pompe constituée par la région supérieure (31) du tube (3) .

12. Système de distribution selon l'une des revendications précédentes, dans lequel l'extrémité inférieure du tube (3) vient en prise avec le fond du récipient (1).

13. Système de distribution selon l'une des revendications précédentes, où l'extrémité supérieure du tube (3) a une ou plusieurs ouvertures d'aération (35) à travers sa paroi pour permettre à l'air de rentrer dans le récipient à travers l'agencement de pompe et pour compenser le volume de matériau distribué.

14. Système de distribution selon l'une des revendications précédentes, dans lequel la plaque suiveuse (5) a une surface de guidage convergeant vers le bas autour de son ouverture centrale (52) pour faciliter l'entrée du tube (3) dans cette ouverture depuis au-dessus.

FIG. 1

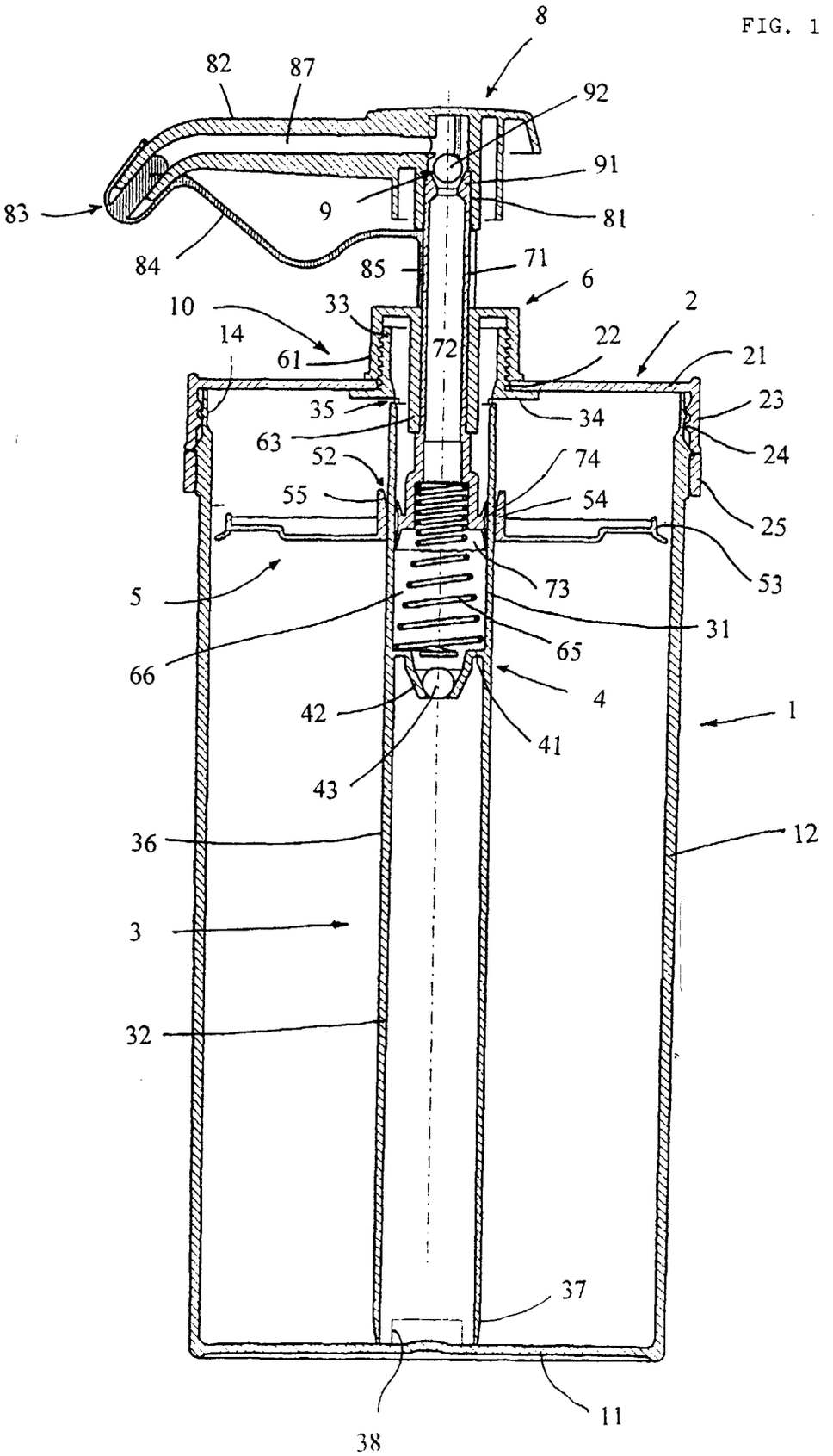
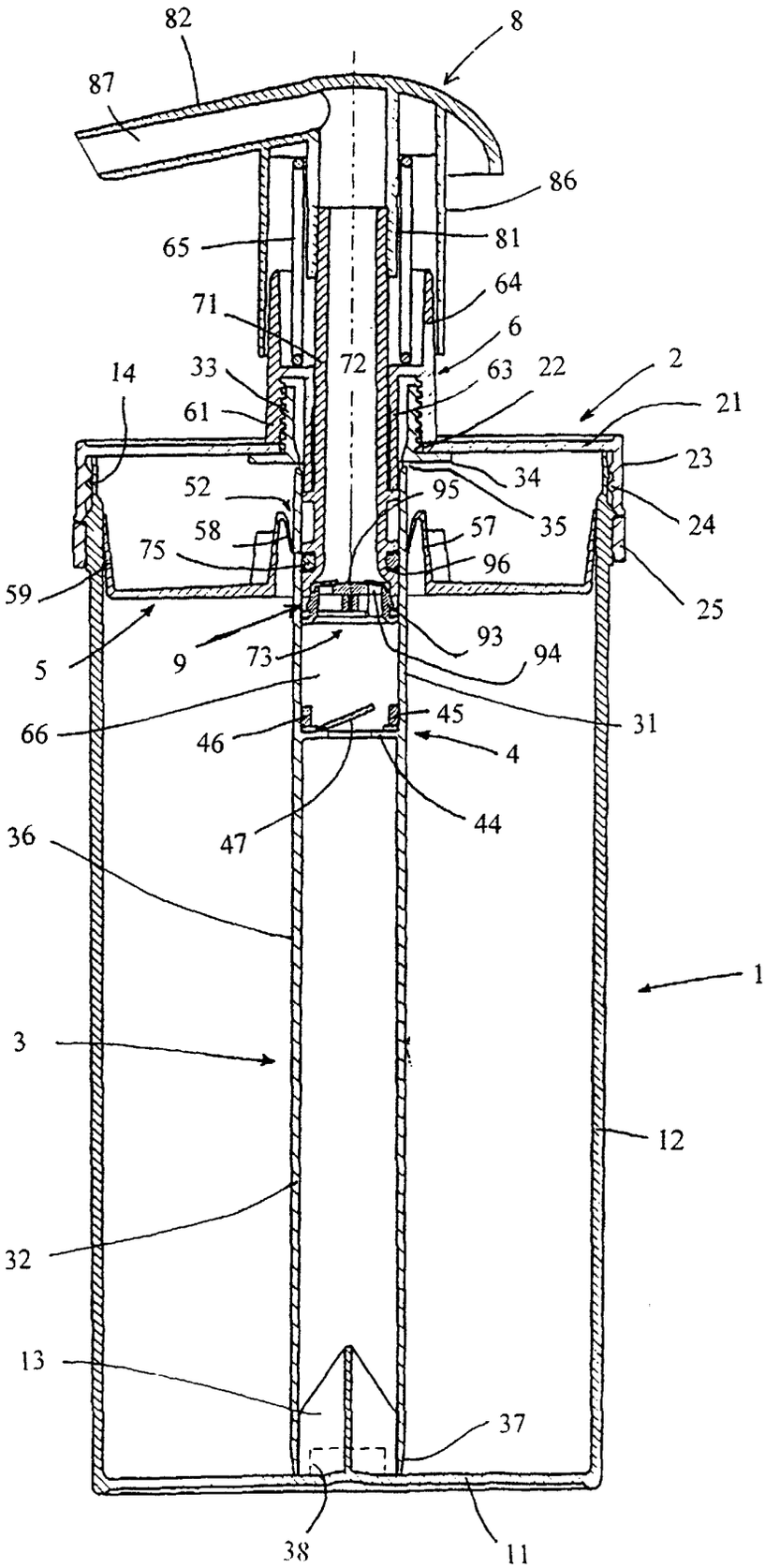

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FIG. 2


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